CQ

JANUARY, 19

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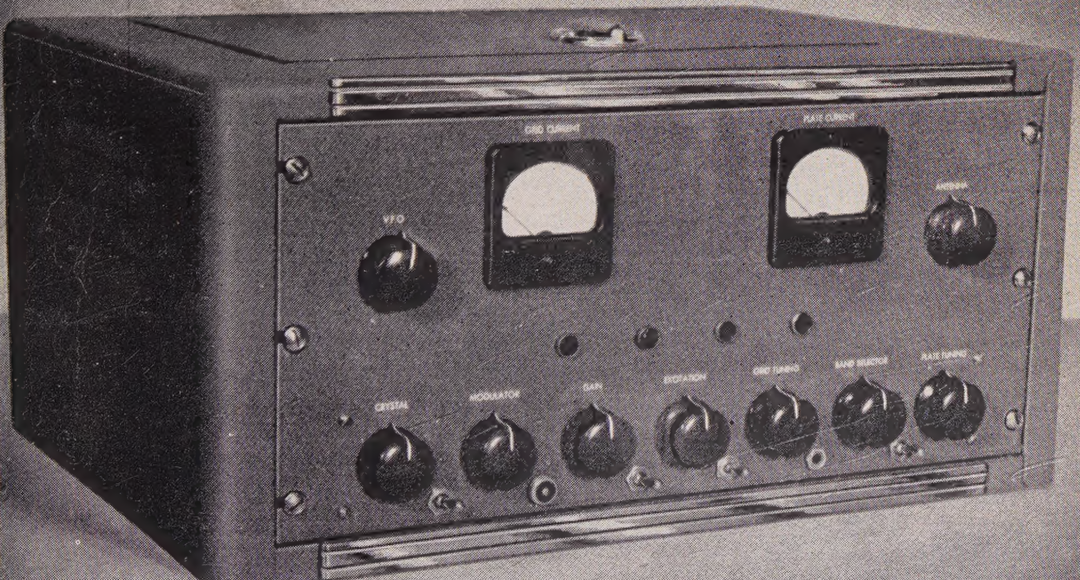

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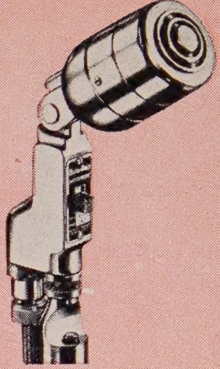

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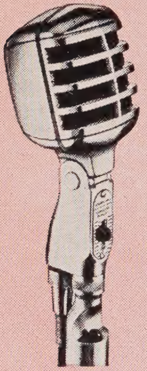

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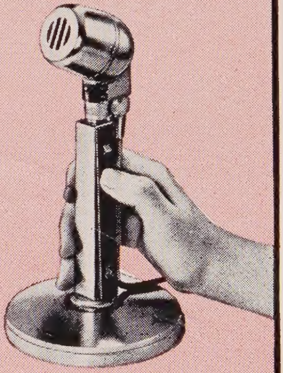

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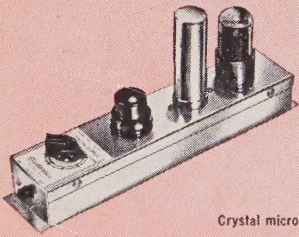

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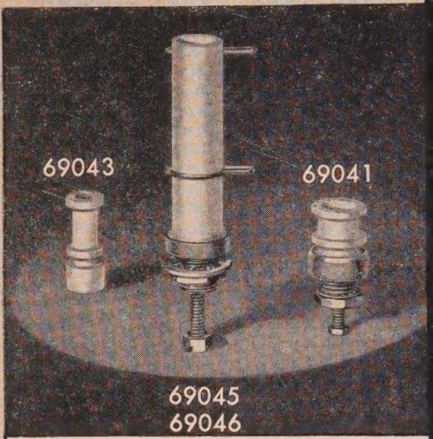

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★ ★ *Letters* ★ ★

Dishonesty in Signal Reports

406 Arlington Ave., Greenville, S. C.

Editor, *CQ*:

I have just received an ARRL Official Observer's cooperative report on my note, signed by a W8. I had been working a W3 at the time who gave me a 577 report. The Official Observer said I was 574. I worked nine other c.w. stations that day, and the above-mentioned W3 was the only one to give me less than T9!

This may sound as though I don't believe that observer chap—that's not the point. I want this letter to be some sort of protest against the "I'll swap you good reports" ham. How can we be assured of honest reporting? The RST system is FB, if the truth were regularly told. Personally, I don't give a hoot if the guy I'm working doesn't like the report I give him. I'll report what I hear, and I sure wish I could depend on the reports given me.

R. B. Smeltzer, W4NZR

A monitor is much more dependable, as an indication of your tone report, than any RST report you get on the air. Why not build a good one, OM, and stop worrying?

TVI with the BC-610

Chicago 43, Ill.

Editor, *CQ*:

I have been a reader of *CQ* for the past two years and have read many interesting articles during that time. I turn to other *CQ* readers, in desperation, for the solution of my problem.

I have a BC-610D transmitter, but, due to the TVI it creates, I must stay off the air during TV program hours. Can you direct me to someone who has licked the TVI problem associated with a BC-610D? I would be ever so grateful to learn how it has been done.

Frank Guetter, W9IHM

How about it, gang? Surely some of you BC-610 boys have licked the TVI monster. How's about to drop Frank a line and let him know how you did it?

The Low Frequencies

Washington Ave., Wycombe, Pa.

Editor *CQ*:

I, and thousands of other amateurs, am primarily interested in the 80 and 75 meter bands. In the past year I have found very few articles of interest to me, and I know there are many others who feel the same way. I suggest that your staff give the low frequencies more attention. There are many topics that could be covered such as antennas for restricted space, radiation angle control (tilted close-spaced beams) effects of the aurora borealis on low-frequency propagation and band condition forecasts. How about a calls heard (at DX points) page, or a 4-mc honor roll?

Harry A. Herbott 3rd, W3GKF

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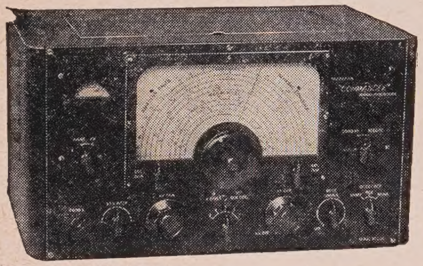

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Deer Hon. Ed:

Are you knowing that half of the peeple in the world are women? No kidding aside. And even more so, are you knowing that there are even women amateurs—all over the bands? Well, you could have knocking me down with a six-foot relay rack when I are finding this out.

Scratchi are getting nice letter from lady who are saying she are an amateur and who are also a Hon. Ed. She Hon. Ed of magazine called *Harmonics*. It are publication of the Young Ladies' Radio League. Getting that, *young* ladies. Hokendoki, here are Scratchi being on air just talking to other men amateurs when all this time are being able to talk to young ladies and I are not even knowing same.

After kicking Hon. Self all over shack are sitting right down and writing nice letter to Hon. Ed. of Harmonics (Barbie, nice name, so?). Scratchi are giving her real snappy line, and even asking her to exchanging photographs, preferably something with her in bathing suit. It are this last part that are probably causing Scratchi's downfall.

You seeing, my XYL-to-be, Lil Watanabe, are visiting house that evening, and I are giving her letters to mail for me, including one to Barbie. Well, it seeming that the letter are coming open, accidental-like. I can not imagining what causing this, unless it are the perfume I are soaking the envelope in.

To make long story short and horrible, Lil are reading letter. You are not imagining what she are calling me. Has a nasty temper, that gal. And where she is learning half the words—I thinking she listening on ham bands too much. Understand, Hon. Ed., that Scratchi are not tied down to any one womans. In fact, to me women are like stations on the air—if you not getting first one you call, there always plenty more calling seek-you.

However, I knowing that Lil are plenty nice gal, and that if I breaking my engagement with her there are lots of other wolves around what would be happy to keep Lil in candy and flowers. So, Scratchi trapped like class C amateur when licensing points are changed. There are nothing to do but facing music, or B flat.

Believing me, it are no easy task to clearing myself with Lil, and the upshoot of it is that I are having to sign paper on which are put Scratchi's New Year resolutions. Lil are not even giving me chance to reading paper, so I are certain that my

(Continued on page 96)

"I'm sure glad I can drop in anytime"

—says Bill Leonard 2SKE

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Grid-Screen Amplification Factor (Av.) - - -	5
Direct Interelectrode Capacitances (Av.)	
Grid-Plate - - - -	0.08 μμf.
Input - - - - - -	8.0 μμf.
Output - - - - - -	2.1 μμf.
RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR	
Class-C Telegraphy or Telephony	
MAXIMUM RATINGS (Key-down conditions, per tube)	
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Plate Dissipation -	65 Max. Watts
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EDITORIAL

On November 16th the FCC brought out a "Further Notice of Proposed Rule Making and Notice of Provisional Designation for Oral Argument" in the matter of Docket 9295. We understood that the FCC would follow the specific suggestions of a united amateur radio—as we said in last month's *CQ*—and they have come pretty close, at that. The new Novice and Technician Classes of license, which should do much to strengthen amateur radio as an institution, are presently scheduled to become a reality on January 1, 1951. There appears to us to be one major "new feature" in the FCC's latest paper—another try for an Amateur Extra Class license.

Two things were made plain to the FCC representatives at the October 13th conference: 1) that amateur radio is prepared to fight any changes in regulations which the amateurs themselves believe to be inimical to the future of the Amateur Service, and 2) that amateur radio will accept no regulations without the showing of definite need for such regulations. The original proposal for an Amateur Extra Class license, which would, effectively, require all present Class A operators, as well as new Class A applicants, to pass a considerably stiffened technical examination and a 20 word-per-minute code test was examined and was found by all of the representatives of us hams to be both unnecessary and undesirable. It was agreed, informally, however, that an Extra Class license, which would not be necessary for the continuing of any *existing* privilege, would probably be acceptable to the amateur body as a whole. Let's see what's been done.

The new setup, as proposed by the FCC in its latest expression in the matter, would permit present Class A licensees, and those who hold Class A licenses (or Advanced Class—a new designation) on January 1, 1952, to renew them indefinitely, and thus retain their present "Class A" privileges indefinitely, so long as the licensees fulfill the renewal requirements. Those not holding a Class A (or Advanced Class) license on January 1, 1952, would, however, be barred forever from Class A (or Advanced Class) and would have to take the much tougher Extra Class examination. The new examination, by the way, would include ". . . advanced radio theory and operation as utilized in modern amateur techniques, including, but not limited to radio telephony, radiotelegraphy, transmissions of energy for measurements and observations applied to propagation, to the radio control of remote objects and similar experimental purposes."

That, as we see it, is the major change which the FCC has made in the regulatory changes settled upon during the informal conference in October. It will now be interesting to learn what the amateur body, as a whole, thinks of this proposal.

In accordance with our policy of informing all of our readers on all matters which are of interest to them, the following is a complete reprint of the FCC's latest release.

FURTHER NOTICE OF PROPOSED RULE MAKING AND NOTICE OF PROVISIONAL DESIGNATION FOR ORAL ARGUMENT

1. Notice is hereby given of further proposed rule making in the above entitled matter. Notice is also given that the above entitled matter is hereby provisionally designated for general oral argument to be held in Washington, D. C., at a time to be later announced.

2. On April 21, 1949, the Commission released a Notice of Proposed Rule Making in this matter. Numerous comments were received with regard thereto from individual amateurs and amateur organizations. In addition, a request was received from the American Radio Relay League that the matter of the proposed rules be designated for oral argument as "a prerequisite to a complete and proper resoluton of the problems presented." On October 10 and 11, 1949, an informal conference between members of the Commission's staff and all interested parties was held in order to discuss the form and substance of the proposed rules. As a result of the comments referred to and the discussion which occurred at the informal conference the Commission has concluded that it would be in the public interest to modify the form and substance of the original proposal in this matter in a manner which it is believed will be found to be generally acceptable to the amateur fraternity. However, in view of the request for oral argument heretofore made in this rule making proceeding by the American Radio Relay League, it is deemed appropriate to designate the matter of the proposal herein made for general oral argument unless it is clearly apparent from the comments filed on the proposal herein made that general oral argument is not desired by any interested party.

3. The modified proposal is set forth in an appendix attached to this Notice. Authority to issue this proposal is contained in Sections 4(i) and 303(b) (c) (g) (1) and (r) of the Communications Act of 1934, as amended.

4. As above indicated, the date for oral argument, if one is to be held, will be announced in a future Notice. All interested parties may participate in such argument if and when it is held. In regard to the rules proposed herein, interested parties may submit comments or briefs in writing until January 16, 1950. Such briefs or comments may be either in opposition to or in support of the rules proposed herein. An original and four copies of such briefs or comments shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION

Adopted: November 16, 1949

T. J. Slowie
Secretary

APPENDIX

PART 12—RULES GOVERNING AMATEUR RADIO SERVICE, is amended as follows:

A new section 12.0 is added to read as follows:

§ 12.0 Basis and Purpose.—These rules and regulations are designed to provide an Amateur Radio Service having a fundamental purpose as expressed by the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international good will.

Section 12.111(a) is amended in the following particulars:

1. Subparagraph (ii) of paragraph (2) is amended to read as follows:

(ii) 3800 to 4000 kc. using type A3 emission and, on frequencies 3800 to 3850 kc, using narrow band frequency or phase modulation for radiotelephony, to those stations located within the continental limits of the United States, the Territories of Alaska and Hawaii, Puerto Rico, the Virgin Islands and all United States possessions lying west of the Territory of Hawaii to 170° west longitude, subject to the further restriction that type A3 emission, or narrow band frequency or phase modulation for radiotelephony, may be used only by an amateur station which is licensed to an amateur operator holding an Amateur Extra Class or Advanced Class license and then only when operated and controlled by an amateur operator holding an Amateur Extra Class or Advanced Class license.

2. Paragraph (4) is amended to read as follows:

(4) 14000 to 14400 kc, using A1 emission and, on frequencies 14200 to 14300 kc, type A3 emission and, on frequencies 14200 to 14250 kc, using narrow band frequency or phase modulation for radiotelephony, subject to the restriction that type A3 emission, or narrow band frequency or phase modulation for radiotelephony, may be used only by an amateur station which is licensed to an amateur operator holding an Amateur Extra Class or Advanced Class license and then only when operated and controlled by an amateur operator holding an Amateur Extra Class or Advanced Class license.

3. Paragraph (6) is amended to read as follows:

(6) 28.0 to 29.7 Mc, using type A1 emission and, on frequencies 28.5 to 29.7 Mc using type A3 emission and narrow band frequency or phase modulation for radiotelephony and, on frequencies 29.0 to 29.7, using special emission for frequency modulation (radiotelephone transmissions and radiotelegraph transmissions employing carrier shift or other frequency modulation techniques).

4. Paragraph (7) is amended to read as follows:

(7) 50.0 to 54.0 Mc, using types A1, A2, A3, and A4 emission and narrow band frequency or phase modulation for radiotelephony and, on frequencies 52.5 to 54.0 Mc, special emission for frequency modulation (radiotelephone transmissions and radiotelegraph transmissions employing carrier shift or other frequency modulation techniques).

Section 12.114 is amended in the following particulars:

1. Paragraph (b) is deleted.

2. Paragraph (c) is amended to read as follows:

(c) The use of narrow band frequency or phase modulation is subject to the conditions that the bandwidth of the modulated carrier shall not exceed the band-width occupied by an amplitude-modulated carrier of the same audio characteristics, and that the purity and stability of such emissions shall be maintained in accordance with the requirements of § 12.133 of these rules.

A new section 12.20 is added to read as follows:

§ 12.20 Classes of Amateur Radio Operator Licenses[1].

Amateur Extra Class.
Advanced Class. (Previously Class A)
General Class. (Previously Class B)
Conditional Class. (Previously Class C)
Technician Class.
Novice Class.

[1] Footnote to Section 12.20

Amateur Extra Class.—This new class of operator license will become available to qualified applicants January 1, 1951.

Advanced Class.—This class of amateur operator license is the same as the Class A with change in name only. It (and the Class A) may be renewed as long as the holder to whom it was issued meets the renewal requirements current at the time renewal is applied for. New Advanced Class (or Class A) amateur operator licenses will not be issued after December 31, 1951.

Technician Class and Novice Class.—These classes of licenses are new and will become available to qualified applicants January 1, 1951.

Section 12.21 is amended to read as follows:

§ 12.21 Eligibility for license.—Persons are eligible to apply for the various classes of amateur operator license as follows:

Amateur Extra Class.—Any citizen of the United States who at any time prior to receipt of his application by the Commission has held for a period of two years or more a valid amateur license issued by the Federal Communications Commission, excluding licenses of the Novice and Technician Classes.

Advanced Class.—Any citizen of the United States who at any time prior to receipt of his application by the Commission has held, for a period of a year or more an amateur operator license issued by the Federal Communications Commission, excluding licenses of the Novice and Technician Classes. New Advanced Class amateur operator licenses will not be issued after December 31, 1951. However, valid Advanced Class (or Class A) licenses outstanding January 1, 1952 may be renewed as set forth in § 12.27.

General Class.—Any citizen of the United States.

Conditional Class.—Any citizen of the United States whose actual residence and amateur station location are more than 125 miles air line distance from the nearest location at which examinations are held at intervals of not more than 3 months for General Class amateur operator license; or who is shown by physician's certificate to be unable to appear for examination because of protracted disability; or who is shown by certificate of the commanding officer to be in the armed forces of the United States at an Army, Navy, Air Force or Coast Guard station and, for that reason to be unable to appear for examination at the time and place designated by the Commission.

Technician Class.—Any citizen of the United States.

Novice Class.—Any citizen of the United States except a former holder of an amateur license of any class issued by any agency of the United States government, military or civilian.

Section 12.23 is amended to read as follows:

§ 12.23 Classes and privileges of amateur operator licenses.—

Amateur Extra Class.—All authorized amateur privileges including such additional privileges in both communication and technical phases of the art which the Commission may consider as appropriately limited to holders of this class of license.

Advanced Class.—All amateur privileges except those which may be reserved to holders of the Amateur Extra Class license.

General and Conditional Classes.—All authorized amateur privileges except the use of radiotelephony on the frequency bands 3800 to 4000 kilocycles, and 14200 to 14300 kilocycles and except those which may be reserved to holders of the Amateur Extra Class license.

Technician Class.—All authorized amateur privileges in the amateur frequency bands above 220 megacycles.

Novice Class.—Those amateur privileges as designated and limited as follows:

(a) The d.c. plate power input to the vacuum tube or tubes supplying power to the antenna shall not exceed 75 watts.

(b) Only the following frequency bands and types of emission may be used, and the emissions of the transmitter must be crystal-controlled:

(1) 3700 to 3750 kc, radiotelegraphy using only type A1 emission in accordance with the geographical restrictions set forth in § 12.111 (a) (2) (i).

(2) 26.960 to 27.230 Mc, radiotelegraphy using only type A1 emission.

(3) 145 to 147 Mc, radiotelegraphy or radiotelephony using any type of emission except pulsed emissions and type B emission.

Section 12.27 is amended to read as follows:

§ 12.27 Renewal of amateur operator license.

(a) An amateur operator license, except the Novice Class, may be renewed upon proper application stating that the applicant has lawfully accumulated a minimum total of either 2 hours operating time during the last 3 months or 5 hours operating time during the last 12 months of the license term. Such "operating time", for the purpose of renewal, to be counted as the total of all that time between the entries in the station log showing the beginning and end of transmissions as required in § 12.136(a), both during single transmissions and during a "sequence of transmissions" as therein

(Continued on page 47)

Everything but the antenna tuner is housed in a single-unit rack cabinet. Add a couple of handles and it becomes a portable. Why not build one to match your receiver and gain real XYL-acceptability?

ROBERT W. CLARK, W0RVD*

Small Rig . . . Big Signal

There's no reason for a "portable" to have either a weak signal or haywire appearance. Here's how Bob Clark built his pride and joy.

Service in the armed forces, with its frequent changes of station assignment, made an extremely compact transmitter desirable without the sacrifice of power or versatility. Also, the possibility of assignment to a television area indicated TVI proofing. These factors were the main consideration in the design and construction of the transmitter to be described. Once the wrinkles were ironed out, the rig was found to be truly "special," considering the ease of band changing and tuning, clean signal, lack of harmonics and parasitics, and low construction cost.

Actually, the transmitter is merely a combination of many well-known circuits, so arranged as to provide all the features felt desirable in a medium powered rig. The astute purchase of commonly available surplus lowered the construction cost considerably, and the symmetrical panel layout, with decal lettering, gave it a finished commercial appearance.

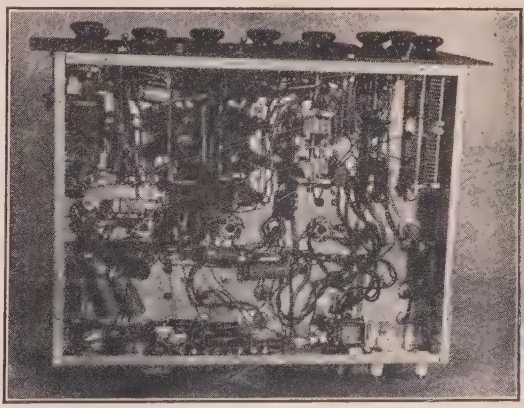
While 120 watts will not disturb the assurance of the kilowatters, it is sufficiently respectable to provide consistent communication, season, sunspots, and frequency notwithstanding. Getting the mostest with the leastest was constantly in mind, and resulted in variable bias to the final, control of excitation, speech clipping, and tank coils specifically designed for low-voltage-high-current finals.

The choice of 807s for the final may puzzle many who have cussed their parasitic capriciousness, but their low cost and splendid performance when handled properly made them a natural choice. As will be seen, careful circuit layout, with routine parasitic precautions, stabilized them beautifully. Indeed, with full load, the final bias may be dropped to zero with absolutely no parasitic tendencies. Even more unusual, with zero bias and no load, there is no indication of parasitics. A little rough on the screens, but dollars couldn't buy that nice warm feeling.

The salient features of the transmiter are: band-switching exciter for all bands, exceptionally stable VFO plus nine crystal positions, slug-tuned buffer and doubler stages, balanced input to final, link coupling between stages, narrow band phase modulation with speech clipping, control of excitation to the final, and bias adjusment of the final to permit Class B operation.

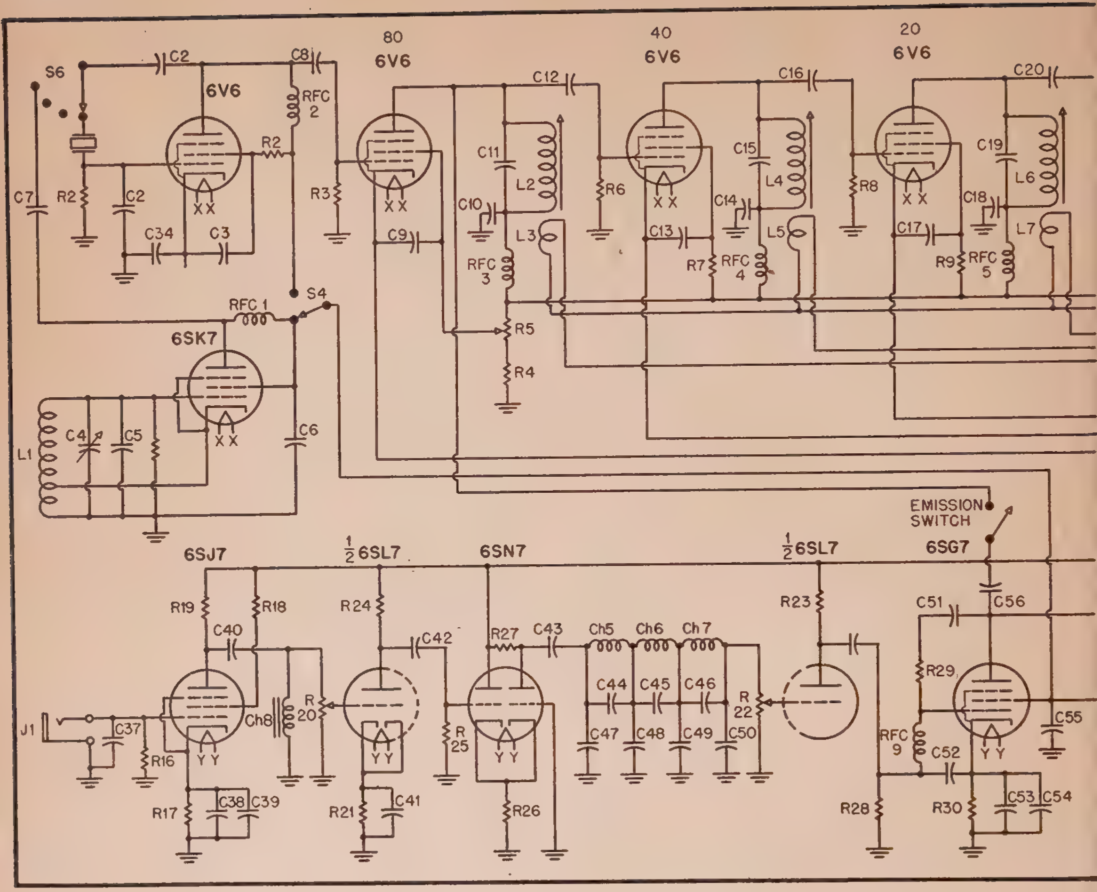
Stabilizing the VFO

The transmitter begins with either the VFO or a Pierce oscillator. The Pierce was chosen because additional controls were not desirable, and the output available was sufficient, with the buffer stage, to drive the final. The VFO is contained in a separate metal box 3 x 5 x 5 inches with removable top and bottom. Placing the oscillator tube inside the box may not seem like good construction practice, but once the tube is thoroughly warmed there is no change in frequency. Actually there is little heating, since there is only 150 volts on the plate. The coil form is of plastic composition, one inch in diameter, five inches long, mounted on the side of the box with metal spacers. For easier construction, make the required number of turns on the coil, then, if necessary to change the



Under-chassis view. Despite the compact arrangement, there is no interaction between circuits. Note the shield between speech and r.f. circuits.

Lt. R. W. Clark, Signal Corp., 30th Communications Squadron, Officers Air Force Base, Omaha, Nebraska.

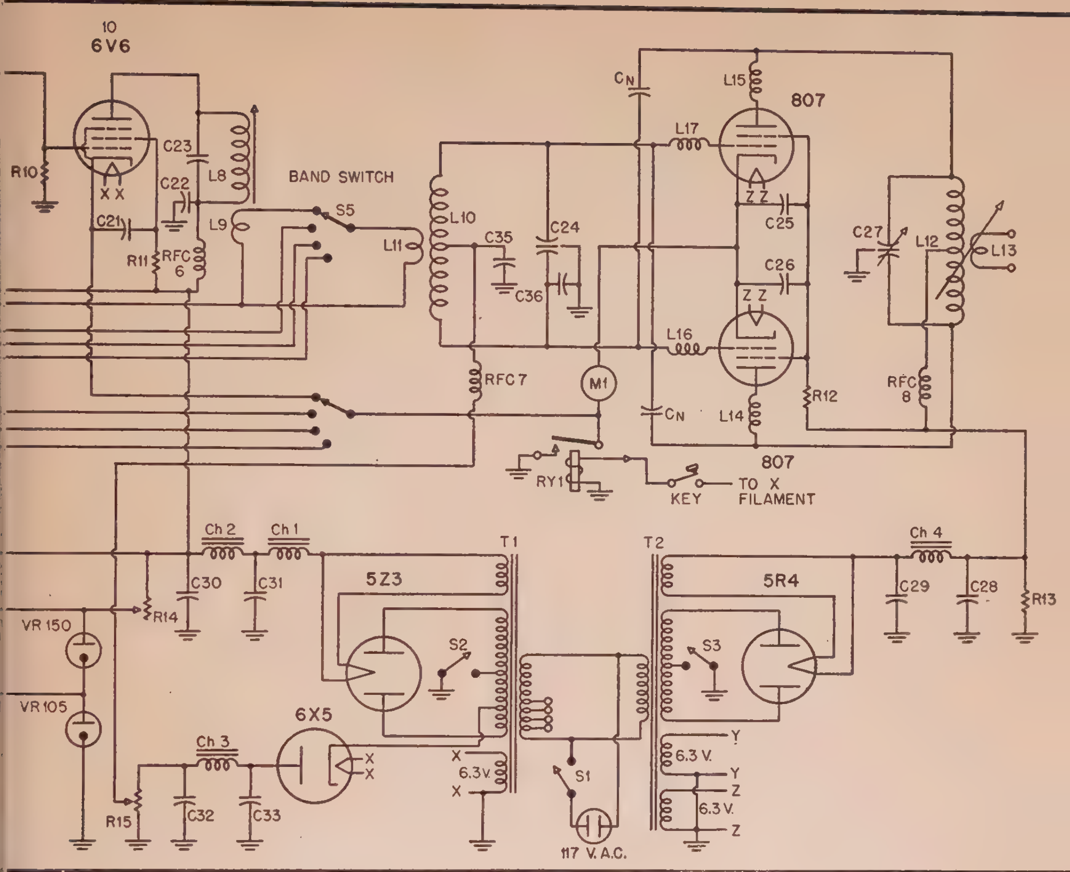


C1, C6, C7, C12, C16, C20, C37 —100 μμf.
C2—107 μμf.
C3, C8, C9, C10, C13, C14, C17, C18, C21, C22, C34, C35, C43, C55, C56—.01 μf.
C4—100 μμf variable.
C5—75 μμf + 10 μμf + 10 μμf, ceramic.
C11, C15—59 μμf, ceramic.
C19—35 μμf, ceramic.
C23—20 μμf, ceramic.
C24—75 μμf, each section.
C25, C26—470 μμf.
C27—100 μμf, each section.
C28, C29—4 μf, 1000 w. v.
C30, C31—8 μf, 600 w. v.
C32, C33—8 μf, 450 w. v.
C36—5-15 μμf padder.
C38—.01 μμf.
C39, C41, C53—10 μf, 25 w. v.
C40, C46—.003 μf.
C42—.002 μf.
C44, C45, C47—.015 μf
C48—.03 μf.
C49—.05 μf.
C50, C54—.06 μf.
C51—.006 μf.
C52—.001 μf.
CN—See text.
R1—50K, 1 w.
R2, R7, R9, R11—25K, 1 w.
R3—10K, 1 w.
R4—20K, 1 w.
R5, R15—30K, 2 w.
R6, R8, R10—100K, 1 w.
R12—15K, 20 w.
R13—35K, 25 w.
R14—10K, 10 w.
R16—2 Meg., 1 w.
R17—1500-ohm, 1 w.
R18, R29—22K, 1 w.
R19—220K, 1 w.
R20—2 Meg. potentiometer.
R21—570-ohm, 1 w.
R22—2K potentiometer.
R23, R24, R28—470K, 1 w.
R25—2.2 Meg.

frequency slightly, changes can be made in the fixed capacity. No variable padders are used. The VFO covers from 3350 kc to 4000 kc, thus operation is possible on the 11-meter band. It will be noted from the photographs that the box is mounted on four rubber grommets to attain a certain amount of shockproofing. Three additional holes with grommets are necessary for the plate, ground, and filament leads. The panel hole is given extra clearance so that the condenser shaft may not be jarred against its edges. To ensure a good ground, a braided strap is connected between the box and the main chassis. The VFO was not calibrated for two reasons: first, for spot operation, the nine crystal positions are available. Secondly, most amateurs use a well-calibrated commercial receiver, and this shack is no exception. With reasonable care, and the occasional use of a frequency meter, there is no danger of extending the bands more than the FCC intended.

Following the VFO . . .

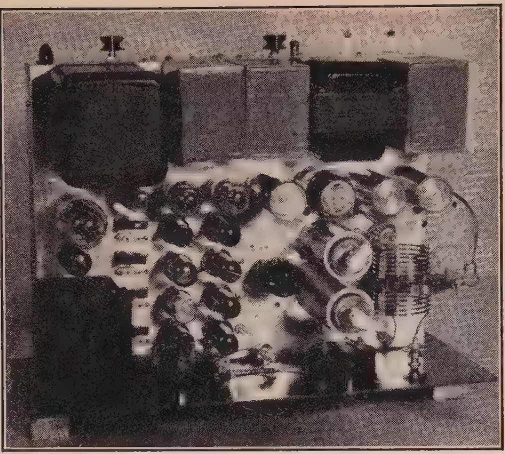
The 80-meter buffer stage was required to boost the output of the oscillator to the grid of the final, to permit phase modulation, and to permit control



R26—4700-ohm.
R27—2000 ohms.
R30—470-ohm. 1 w.
L1—17 turns #18 DCC 1½ x 4" form, tapped 5 turns from ground end.
L2—38 turns #24 DSC bank wound Stanwyck #312 form.
L3—3 turns #24 DSC.
L4—19 turns #24 DSC bank wound Stanwyck #312 form.
L5, L7, L9—3 turns #24 DSC.
L6—15 turns #24 DSC, Stanwyck #312 form.
L8—14 turns #24 DSC, Stanwyck #312 form.
L10—3.5-Mc., 23 turns #18 DCC, 1" long, 3" diam.
7-Mc., 15 turns #18 DCC, 1" long, 2" diam.
14-Mc., 9 turns #18 DCC, 1" long, 1¼" diam.
28-Mc., 5 turns #18 DCC, 1" long, 1¼" dam.
L11—3 turns #18 DCC.
L12—3.5-Mc., Johnson 150LCS80.
7-MC., Johnson 150LCS40.
14-MC., Johnson 150LCS20.
28-MC., Johnson 150HLS10.
L13—150/500 SL5.
L14, L15—12 turns #18 DCC, 1½" long, 1/3" diam.
L16, L17—14 turns #22, 1" long, ¼" diam.
CH1, CH2—10 hy., 150 ma.
CH3—12 hy., 50 ma.
CH4—8 hy., 200 ma.
CH5, CH6, CH7—125 mhy.
CH8—12 hy. (See text)
M1—0-300 ma.
M2—0-15 ma.
J1—mike jack.
RFC1-RFC9—2.5 mhy freq. choke.
RY1—keying relay 6 v., s.p.s.t.
T1—750 v. CT, 6.3 v., 5 v., with bias tap, Chicago Trans. Co. #8274 (P10 RA-74).
T2—Stancor P-6170.

of excitation by varying its screen voltage. A check of the circuit diagram will show that there is no meter switching, which simplifies the wiring considerably. It was found that even with a 10-meter coil in the grid circuit of the final, enough excitation was present to give a final grid milliammeter indication for tuning the buffer. This naturally follows through on the other bands. Slug-tuned coils were used for the sake of compactness, and, with ceramic condensers, work admirably. The coil forms are Stanwyck 312s rewound by cut and try. Little difficulty was experienced in getting them to resonate. While the wax-impregnated cardboard forms aren't ideal for the high frequencies, there is more than ample excitation available for the final. No neutralization of the buffer was necessary. The plates of the buffer and doubler stages are capacity coupled to the grid of the next stage, with link coupling to the final grid coil.

The 40-, 20-, and 10-meter doublers follow through in circuit repetition, with the exception of the constants. Bandswitching is accomplished by closing the cathode circuit of the desired stage and



Layout of the chassis. VFO is enclosed in the box at the lower left. The two knobs on the rear panel adjust bias and speech clipping. Adjusting screws for coil slugs are visible between the doubler tubes and grid coil.

simultaneously completing the link circuit. The cathodes are keyed, and, while it is not easy to filter cathode keying, it was found that there were no clicks or chirps, and that the keying was clean and easily read.

The final amplifier circuit is standard with the exception of the parasitic precautions already mentioned, the use of low-voltage-high-current-ratio tank coils being a switch. These are commercially available and obviate the pruning usually necessary. The link is also plug-in, and may be purchased with three, five, or twelve turns, depending on the line. The grid coil is a standard plug-in form, with a three-turn link at the center. The coil is center-tapped for biasing and metering. Balancing of the input is accomplished by a 5-15 $\mu\mu$f padder across one side of the split stator condenser. Inserting a milliammeter in each screen lead, the padder is adjusted until the currents in each are equal. This adjustment is rather critical, and, while it may be made with one meter, it will be found that as the current in one increases, the other will decrease. Incidentally, the balanced amplifier is of no small importance in achieving real efficiency.

The wire-wound potentiometer across the output of the bias supply permits varying the bias from zero to 150 volts negative. For c.w. operation, the bias should be -45 volts. For NBPM -32 volts will give Class B operation, desirable for the reduction of television interference. When the final was first constructed, the only parasitic precautions taken were suppressors in the grid leads. These consisted of 14 turns of No. 22 wire on a one-quarter-inch form one inch long. With plate voltage off, tuning the final tank showed r.f. getting through. Application of plate voltage disclosed operating-frequency and high-frequency parasitics. There was only one solution to the operating frequency parasitics: neutralization. Four small isolantite pillars were found in the ever-present scrap box. Two of these mounted upright, with an 8-32 screw through each, provided the condensers. The flat heads of the screws presented sufficient capacity to neutralize, and, since the space between was variable, a certain amount of adjustment was possible. By crude formula, the space was set for one-half inch, and this proved to be just exactly right.

This left only the v.h.f. parasitics to contend with. The plate lead was lengthened, and then wound into a self-supporting coil of twelve turns, one-half inch in diameter, and one and one half inches long. The plate lead is of No. 18 d.c.c. wire. As though by magic the problem was solved. After previous difficulties with 807s, it was almost too much to believe, but, despite every conceivable test, there was no indication of parasitics.

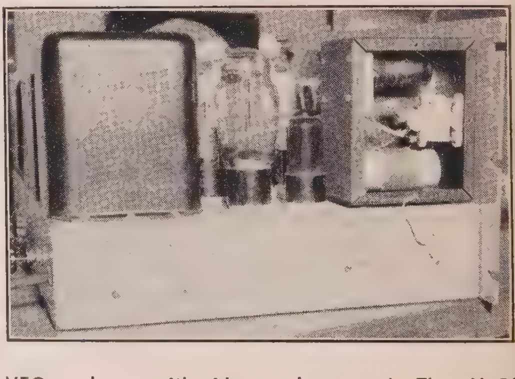
The excitation control has been found invaluable for proper operation of the 807s. A direct check on its worth may be had by using a lamp for a dummy antenna, and varying the grid drive by this control. With exactly 6 ma on the grid meter, the lamp will be brightest. Increase or decrease the drive a mere mil or two and you can see the brilliance diminish.

Power Supply

The power supply is conventional with the exception of the bias tap off the high voltage winding of the low-voltage transformer. This added a desirable feature to the transmitter and was utilized. A high-vacuum rectifier was used in the high voltage supply in the interest of compact arrangement and condenser input. The Stancor P-6170 transformer supplies 600 volts at 200 ma, and, since this supply is used only for the final, there is 120 watts input—less the small amount of current consumed by the bleeder and screens.

The phase modulator uses a 6SJ7 for the first speech amplifier. This stage is run wide open, with the deviation control in the grid of the second amplifier, one half of a 6SL7. The output of this stage works into the clipper circuit utilizing both sections of a 6SN7. The values shown for clipper inductances and capacitances should be fol-

(Continued on page 43)



VFO enclosure with side panel removed. The 6V6GT directly to the rear is the Pierce crystal oscillator.

Public Service

O. P. FERRELL, Project Supervisor*

The program referred to as "Radio Amateur Scientific Observations" represents the greatest single contribution to the furtherance of radio communications the amateurs have ever made. Here is a report on the present status of this Sporadic-E study.

This is the first official report on the progress of the 50-mc Observing Project[1]. Interest and project activity remains at a fairly high level. Tabulations covering the period January 1 to April 30, 1949, have been cleared and are now being analyzed . . . January 1, 1950, will see the RASO Offices in new quarters, although in the same building. The new offices are being designed to fit the proposed operation of this project for the next year . . . Speaking of outgrowing things, the monthly Newsletter which is distributed to all Observers has outgrown the duplicator stage and is now being mimeographed. All Observers outside of the North American continent receive this letter via airmail, and from all reports it is being greatly appreciated and very widely read . . Over 100 *Tropical Tramps* Certificates awarded to 6-meter stations who have worked HC2OT across the equator were mailed during the month of November. All recipients, whether or not they were Project members, should have their certificates by the time this appears in print . . . Considerable effort is expended on instituting a system of beacon transmitters, and the high points are covered in the VHF column by W2PAU.

New Observers Wanted

In an Observing Project of this nature it is necessary to reduce the observational bias by obtaining as wide and varied a distribution of Observers as possible. The solution of certain ionospheric meteorological aspects of this project can only be solved if a better distribution is obtained in the midwest. At the present time, regular 6-meter activity in the following areas would be of immense help in this program:

1. All of Virginia below Washington, D. C., Eastern Kentucky and southern West Virginia.
2. Northern California, central and southern Oregon, western Idaho.
3. Northern Arizona, southern Utah and Nevada.
4. North Dakota, eastern Montana, western South Dakota.
5. Alberta, Canada.
6. Area immediately north of Lake Superior and Lake Huron.

Any radio amateur in one of these areas who is contemplating operating 6-meters will find it well worth his time to contact this office. Latest information can be supplied on prospects of local activity and coverage, together with data on the prospects of DX. As a matter of fact, any amateur who is planning to operate 6 meters may obtain useful information by addressing an inquiry to this office.

SWL Observers Wanted!!

In the 6-meter observing project, just as important a part is played by Observers who listen only as by those Observers who engage in two-way communication. The reports submitted by SWLs permit cross-checks to be obtained which verify the times as well as the extent and character of sporadic-E propagation. Thus, the RASO Projects provide a natural incentive for SWL interests. Any SWL who has 6-meter receiving equipment is urged to contact the RASO Project office. They will send information on the duties of each Observer. All members of the project, whether or not they are transmitting hams, receive the Monthly Newsletter and special 6-meter announcements issued from this office.

Latitude and Longitude Questionnaires

Many amateurs operate 6 meters only when the band is sure to be open for short skip type of DX. Otherwise, their interest in 6 meters is at a very low point. However, even such spasmodic operation is valuable in this research program. Recently, many of these periodic operators have been sent a questionnaire requesting information that might be used to pin-point their QTH in degrees of latitude and longitude. Quite a number of these inquiries are still being held open in our files. If you have received one of these questionnaires, please answer it as soon as possible. The information requested is important and does form a vital part of this project.

One other factor that might be mentioned here is the possibility that you may receive a questionnaire although you have never operated on 6 meters. If this should happen, it is a case of mistaken identity, and your notification that you have not been on 6 meters will also aid in establishing the scientific accuracy of these reports.

6-Meter Observing Project — Nov. 25, 1949

A total of 2146 Screened Observations, received from over 250 cooperating 50-mc hams, has been processed so far.

**%Radio Magazines Inc., 121 South Broad St., Philadelphia 7, Pa.*

[1] *This work is supported in part by Contract No. AF19 (122)-72 and modifications with the U.S. Air Force, through the sponsorship of the Geophysical Research Directorate, Air Materiel Command.*

Designing the QSL

OTTO L. WOOLLEY, W0SGG*

If you can't find a design you like among your QSL printer's samples, roll your own. Here's the inside story on home-grown card designing by an old-timer in the business.

THE QSL CARD IS THE FINAL COURTESY OF A QSO. In most cases it is also the only tangible evidence that remains of a pleasant or noteworthy radio contact. For this reason many operators go to some lengths to secure designs for their cards that are workmanlike, attractive, and outstanding.

Due to the unique nature of the QSL, its design can be generally best handled by persons familiar with the purpose and requirements thereof. Most amateurs are capable of making their own layout, particularly if they have a few concise facts to guide them.

Layout Considerations

Effective layout requires that some portions of the text be subordinate to the more important portions that are to be emphasized. Equally important is the allowance of plenty of space around the printing itself. A few moments spent in thumbing through the advertising section of any magazine will bring out both of these points clearly. It should be noted that large national advertisers almost always leave large quantities of space around the key words, with the balance of the message grouped and paragraphed attractively in such a manner that it does not detract from the major part of the advertising. These are well-founded principles based on long usage and are directly applicable to the design of the QSL card.

Type face, or the style of lettering, can also have a subtle but noticeable influence in delivering the printed message. Obviously a solid, blocky, bold-face type would be much more suitable for the use of a contractor or blacksmith than it would be for a jeweler, the latter deriving better representation from a graceful style of type or script. Few people not engaged in the industry are aware of the fact that type styles change from time to time in much the same way that clothing styles vary. Therefore, it is wise to check on the type faces selected to see that they are fairly recent issue.

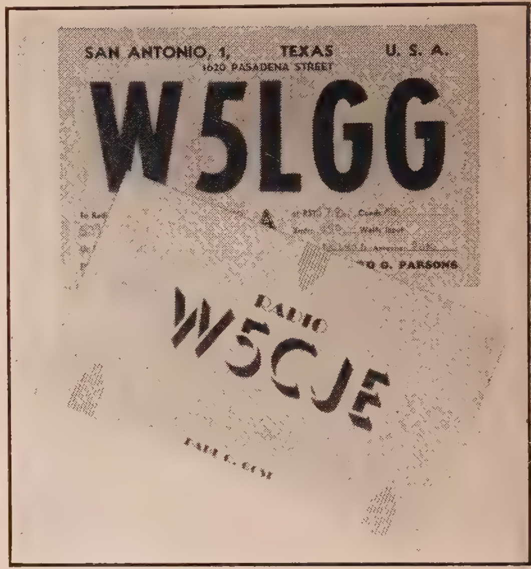


Fig. 2. Good examples of bold and conservative layouts. Both cards are nice QSLs.

The Color Scheme

The choice of colors is to a great extent a matter of personal opinion or liking, but in all cases, combinations should be selected that give good clear contrast between the print and the card. Some colors are known to have definite effects—for instance, reds are "exciting," yellows and oranges are "warm," blues are "cool," greens and browns generally are considered to be "neutral,"

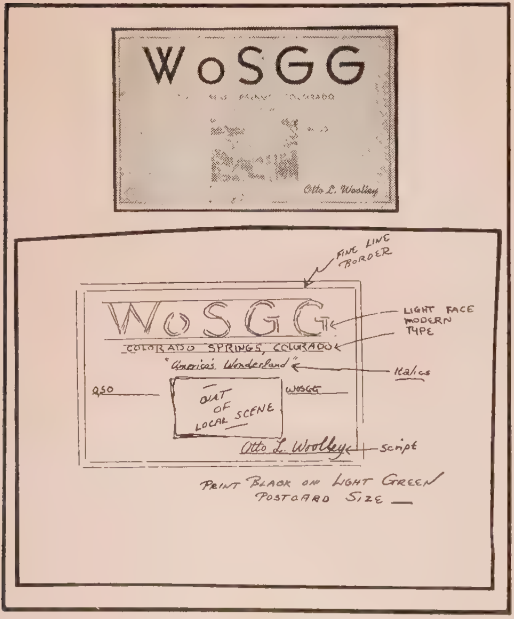


Fig. 1. A typical pencil layout as given to the printer and the QSL card as printed.

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*535 E. Platte Ave., Colorado Springs, Colorado

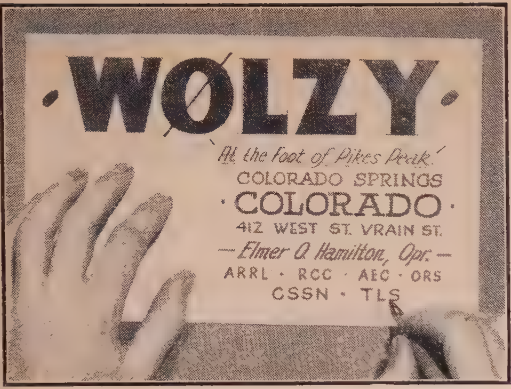

Fig. 3. Artist preparing a QSL design suitable for a cut or line negative. The design is always in proportion to the finished size and generally twice as large.

purple suggests royalty, and grey is "sober." Colors of opposite effect can often be combined to give very attractive results. Red on warm grey and brown on medium yellow are well known examples. Avoid combinations of similar characteristics like dark blue on a light blue card, which would lack strength, or bright red on a yellow card, which would appear garish and cheap.

To prepare the layout for the printer, draw the outline around a postcard and pencil in the wording as you expect it to appear. Such a layout is shown in *Fig.* 1 with the printed result. In this case it was required that the printer furnish a "cut" of a local scene, and a nearby mountain view was selected. Most printers have such scenes on hand and will be glad to work them into the layout on request. If a photo of the station or operator is wanted, a cut must be made for the purpose. If the printer does not do this himself, he can tell you where to have it done. Clear sharp photos are needed for the making of a cut, and the 8″ by 10″ professional size is preferred.

Figure 2 provides a rather good contrast between a bold layout and a comparatively modest type of card, the latter utilizing the correspondence space on the address side for the QSO data. Although considerably different, both cards are very nice and are quite typical of contemporary design.

It is practical to have a cut made for the entire QSL card. This necessitates an artist's drawing, as shown in *Fig.* 3. This drawing should be made twice the size of the desired finished dimensions. For postcards this is 7″ by 11″ and the reduction is made in the manufacture of the cut. Most commercial sign shops can produce very nice drawings of this sort, and of course commercial artists do this sort of work regularly.

Photographic Cards

Another method of printing QSLs from an artist's drawing is the photographic contact printing method with a "line negative." In this case the drawing is sent to the photo shop where a postcard-size negative is prepared, as shown in *Fig.* 4. A blank space in the lower left corner has been left for the operator to insert a negative of the station. The card that results from such a process is shown in *Fig.* 5, printed on sensitized postcard stock available from most photo supply houses with the instructions for contact printing. Any photo shop will do the printing at the usual rates; however, in many cases a saving may be made by home printing. The line negative is inexpensive, and this feature is of value to the operator who changes designs frequently. The insert negative may be changed at will, a point that may have value in certain instances. The address side of the sensitized postcard has the prepared correspondence space in which the QSO data may be recorded.

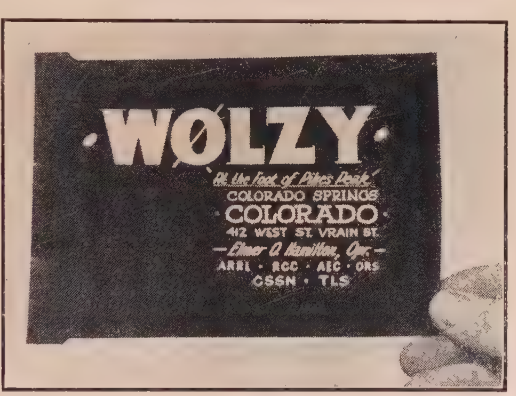

Fig. 4. A line negative used for the contact printing of portcard QSLs on sensitized stock. This negative is made from the drawing in Fig. 3.

In filling out QSLs for mailing, regardless of the type card in use, nothing contributes more to the appearance and permanence of the written message than the use of drawing (black India) ink. This ink is jet black and waterproof and will look good on the other fellow's wall for years to come.

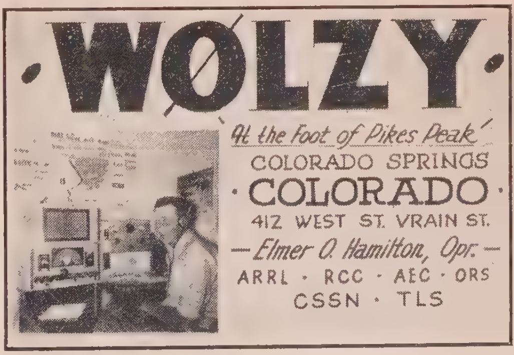

Fig. 5. Finished QSL printed from the line negative of Fig. 4. A corner of the line negative was removed and a snapshot negative inserted to put the station photo on the card.

The Zig-Zag Array

J. W. STEIDLEY, W6ESY*

A compact sixteen-element, vertically-polarized beam, with a gain of over 11 db, which you can build for about seven dollars.

It is particularly true in the antenna field that you never get "something for nothing." Gain, bandwidth, and physical size are closely related, and any change in one must be at the expense of one or both of the others. In spite of the somewhat unusual appearance of the antenna to be described, it is no exception to the above, and the measured gain proves to be almost exactly that derived from the aperture area. It does, however, offer maximum performance within its size with definite advantages of simplicity of construction and adjustment.

Theory of Operation

This antenna is fundamentally a condensed version of the Chireix-Mesney, French array, which dates back a good many years, and was used in large curtains at high frequencies. The actual operation of the array can, perhaps, be most easily seen from *Fig.* 2. Starting with the two-wavelength open ended transmission line of *Fig.* 2A, with the current flow in each half-wave section being indicated by the arrows for excitation at either end or any high voltage point, the basic radiating section of the antenna can be formed by assuming the transmission line to be pulled into the shape of *Fig.* 2B by pulling out the X-marked points and holding the original spacing at the Y-marked points. It will be seen that the vertical components of the current flow in each half-wave section are all in the same direction, while the horizontal components all oppose each other—thus effectively cancelling the horizontally-polarized radiation. The vertical in-phase components form, in effect, a broadside array of eight elements fed in phase. A similar explanation of the operation may be arrived at by considering the upper and lower halves as being long-wire antennas folded to keep the vertical current components in phase.

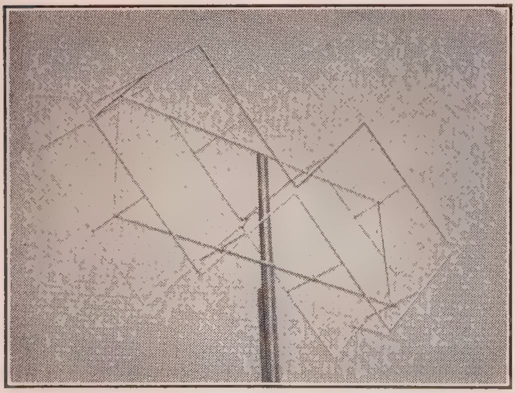

Fig. 1. Here's how she looks when completed and mounted atop your tower.

The operation of the parasitic reflector is conventional, and the reflector is an electrical and mechanical duplicate of the radiating section, spaced a quarter wavelength behind the driven half. The antenna can be fed at either end or at the center, but, to maintain exact symmetry, it is highly desirable to feed the antenna at the center point. The impedance at this point for the full array is from 600 to 900 ohms, depending upon the size of elements used.

The resulting complete array is a compact sixteen-element, vertically-polarized beam requiring no phasing lines, and with a gain of approximately 11.5 db. The measured vertical and horizontal patterns are shown in *Figs.* 3 and 5. The horizontally-polarized radiation is too weak to be indicated on the same pattern scale with the vertical pattern. The antenna can, of course, be used on horizontal polarization by rotating the mounting 90°.

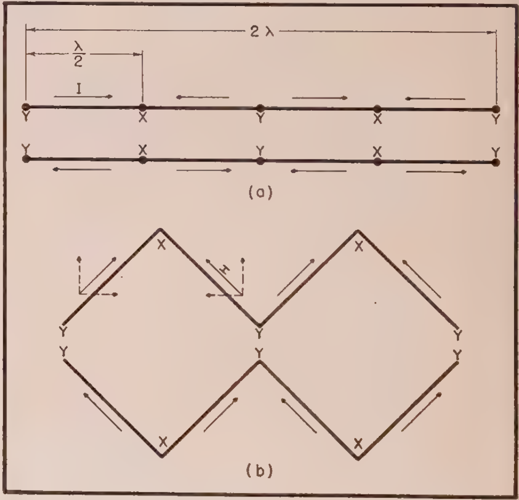

Fig. 2. The development of the Zig-Zag array, illustrating a two-wavelength transmission line (a), and its transformation into a hot antenna (b).

Constructional Details

The antenna illustrated in *Fig.* 4 was constructed in a matter of a few hours at a cost of approximately $7.00 for the aluminum involved. Each of the four main element sections is a continuous piece of one-quarter inch soft drawn aluminum tubing. The horizontal spacers are quarter-wave sections of $\frac{5}{16}$-inch hard drawn tubing. These spacers are slotted at the ends with a rat-tail file, slipped over the quarter-inch element sections at the center of each half-wave section, and crimped around the quarter-inch tubing with gas pliers. The supports for the upper and lower halves of the antenna are two pieces of ⅞-inch, 0.065-inch wall thickness, hard drawn aluminum tubing which was notched with a hack saw to receive the $\frac{5}{16}$-inch spacers, and then secured to the spacers with a single 6-32 bolt at the center of each spacer. It will be noted that in the antenna in *Fig.* 1 there are two extra vertical struts between the spacers at each end. They were added to this particular antenna because of the twisting in the U-channel used as the vertical support, and would not be necessary if a stiffer support were used. The feed line is attached across the center of the driven section with element clamps made from pairs of small cable clamps.

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*United States Navy Electronics Laboratory, San Diego, Calif.

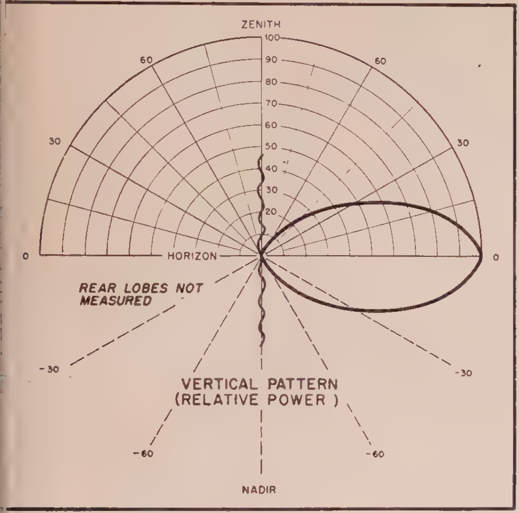

Fig. 3. The radiation pattern in a vertical plane, illustrating the low angle of radiation attainable with the Zig-Zag array.

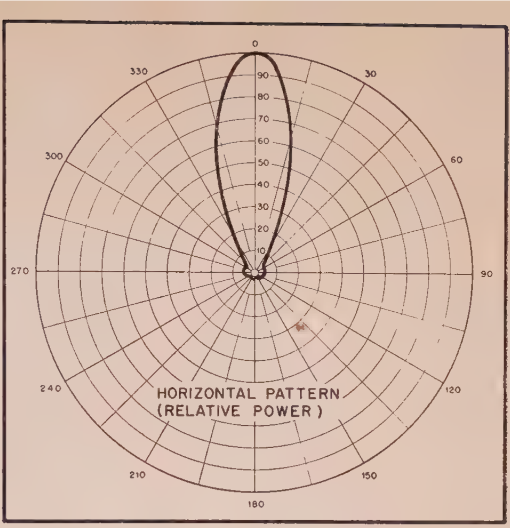

Fig. 5. The radiation pattern in the horizontal plane is sharp enough to please the most rabid beam enthusiast.

The construction described can be modified or varied to meet the desires of the individual constructor. Any combination of horizontal or vertical members may be placed between the centers of the half-wave elements, as these points are zero current points and the vertical members less than the resonant length.

The antenna shown is fed directly with 300-ohm twin-lead, since the resulting 2.5 to 1 standing wave

(Continued on page 82)

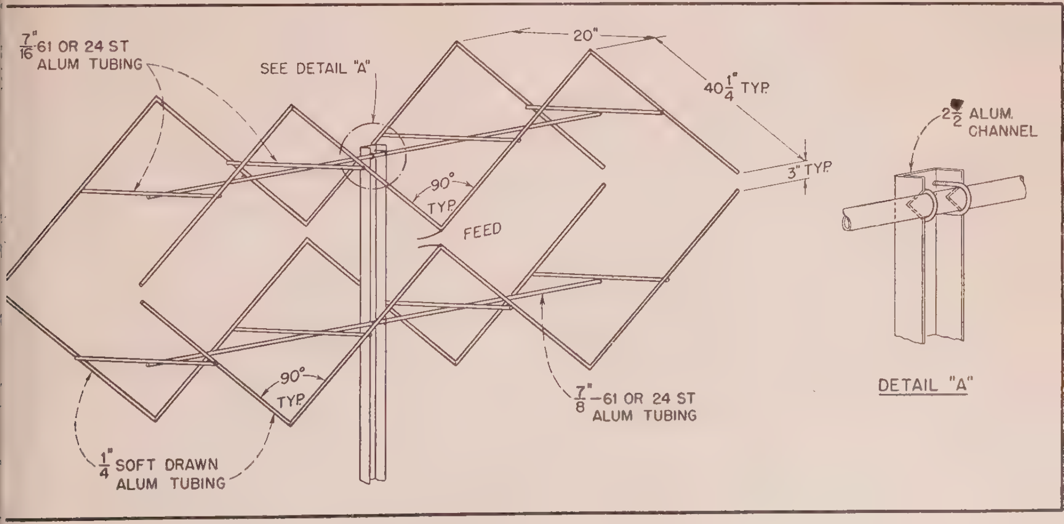
$\frac{7}{16}$"-61 OR 24 ST ALUM TUBING
SEE DETAIL "A"
20"
40$\frac{1}{4}$" TYP.
3" TYP.
2$\frac{1}{2}$" ALUM. CHANNEL
90° TYP.
FEED
90° TYP.
$\frac{7}{8}$"-61 OR 24 ST ALUM TUBING
$\frac{1}{4}$" SOFT DRAWN ALUM TUBING
DETAIL "A"

Fig. 4. Structural details of the Zig-Zag beam.

Licking the Regulation Problem

JOSEPH SAUGIER, JR., W9KSQ*

An automatic voltage regulation system which you can install in your rig at moderate cost. If your power transformer runs too hot for your nervous system, read on!

No one denies the desirability of good high voltage power supply regulation in a c.w. rig. In many cases the cost of good regulation is exorbitant, and, as many of us have found out, high current-high inductance chokes are scarce on the surplus market.

To those who are starting to build, and to those who already have high voltage supplies and want better regulation, I address this article; you may as well know right now it may cost you as little as nothing and as much as five dollars plus a little rebuilding. In any event, the cost is low for excellent high voltage regulation.

Regulation, which involves a rise of the d.c. output voltage from a power supply when the load current through the choke input filter system is reduced, is derived from two sources. One source with which we are all familiar, and one which cannot be inexpensively removed, is ohmic resistance in the transformer and chokes. The omnipresent a.c. line regulation also deserves mention. These regulation factors will not be treated here, although their effect will be reduced by the system to be described. The second, and most troublesome, cause of poor regulation comes from the use of insufficient inductance in the input choke. The important thing to mention here is that if the choke does not meet a certain requirement, the output voltage rises sharply when the key is up and the mercury vapor rectifiers take an awful beating. With key up, the rectifiers in such a supply are required to deliver an excessively high peak current while supplying but a fraction of the power required by the final with the key down. For instance, it is possible to ruin a pair of 866s very quickly by passing only 100 ma to a bleeder if that input choke is not sufficiently large! The same tubes can pass 500 ma for their normal life if the filter into which they operate is properly designed. How many 866s have you lost recently? Does your plate transformer run hot, seemingly without reason? Chances are, OM, it wasn't those darned surplus tubes or overrated transformers—it was your improperly designed high voltage power supply! Incidentally, the high voltage doesn't count against the life of mercury vapor tubes if the inverse peak voltage is not exceeded. Few of us are foolish enough to exceed that rating more than once.

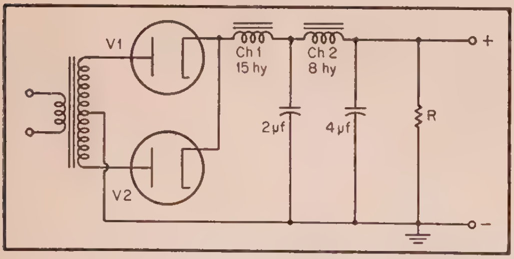

Fig. 1. A typical power supply with standard "regulation insurance"—an input choke and a bleeder.

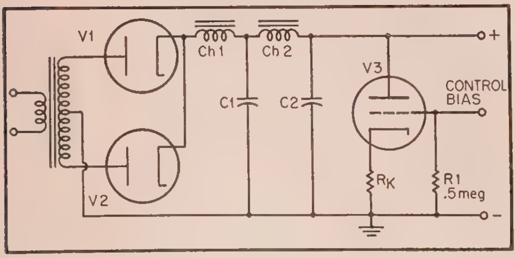

Fig. 2. The use of a vacuum tube in place of the bleeder solves most of the regulation problems, as explained in the text.

The Problem

Now down to business. *Figure* 1 shows a typical circuit for a power supply capable of running the final of any kilowatt station. If the first (input) choke is to prevent the above-mentioned ills of poor regulation, the bleeder *R*, or the total load resistance on the supply, must at all times satisfy the conditions imposed on it by equation (1). Equations (2) and (3) are given here and will be used later.

$$(1)\quad R \leqq 1000\ L$$

$$(2)\quad I \geqq \frac{E}{1000\ L}$$

$$(3)\quad P \geqq \frac{E^2}{1000\ L}$$

R is in ohms L is in henries
I is in amperes P is in watts

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*Hamilton, Illinois

Equation (1) is the basic equation pertaining to he regulation problem at hand. If you already have the choke for your supply, R is fixed by Eq. (1) Low, isn't it? The equation may be stated in more meaningful forms to the ham, and appear as Eqs. (2) and (3). Some examples will confirm your worries. First, assume a supply of 1500 v. d.c. with an output choke of 15 henries. Eq. (2) indicates a bleeder current of 100 ma, and Eq. (3) hows a power of 150 watts lost from the power upply capabilities, key up or key down. Not too bad. Second, assume a 2500 v. d.c. supply with the ame input choke. Eqs. (2) and (3) show a bleeder current of about 167 ma, but the power ost is 417 watts. A similar 3000-volt supply would have a power loss of 600 watts! Key up, that is the cost of regulation—key down, it's murder. No ncouragement can be given to those who would buy a new choke. A power loss of 200 watts may ound reasonable enough to the high-power man who has a 1.5 kw supply—say 2500 volts at 600 ma. Substitution of the 200 watts in Eq. (3) shows hat the input choke must have an inductance of *80* henries at *83* ma, from Eq. (2), which means *eware of the swinging choke.*

It is easy to see why equations (1), (2), and (3) have prevented the amateur from having good regulation in the high-power rigs where it is most needed. The cost of a big choke is too high, and the waste of key-down power cannot be tolerated. That this state of affairs need not exist will now be shown.

The Solution

The same basic power supply is shown in *Fig. 2*, except that a vacuum tube is in the bleeder spot. Examination shows that, provided no voltage is developed across R_1, the plate current of V_3 is determined by R_k, which is a simple cathode bias resistor. R_k may be adjusted to allow the amount of current specified by Eq. (2) to flow when the key is up. It is readily seen that more than one tube may be used in a simple parallel arrangement in the bleeder circuit. The interesting feature of this system is the possibility of placing cut-off bias on the control grid of the bleeder tube(s) when the key is down. It is possible to derive this bias from the grid current of one of the class C stages in the rig, and it may be the grid current of the final if the excitation is keyed. The enterprising ham will find many ways of deriving and applying the desired bias with keying. There it is, OM, all your power when the key is down and excellent regulation with the key up. Because no current is wasted when the key is down, the chokes may have a lower current rating—and that is a big saving as high-current chokes are expensive if they have inductance too!

I promised low cost, and here's how. V_3, the bleeder tube(s), are a surplus item and happen to be about the cheapest tubes on the market at present. For most supplies one or more 211s with carbon plates will do nicely. These tubes have 100-watt plates, and, since they may be had for next to nothing on surplus, no one will hesitate to let them momentarily dissipate two or three times their rated power. A good supply of spares can be picked up for $1.50, and sockets are available from hams who have BC-375 rigs or from any radio junk counter for your price. The filament transformer will be no problem to the average ham with a junk box, or it can be purchased for several dollars. The 304TL is another possibility for the bleeder tube, but it costs more to socket and heat. The 211s may be used on any supply up to 4000 volts; bias requirements at this plate voltage would be about —350 v. for cutoff.

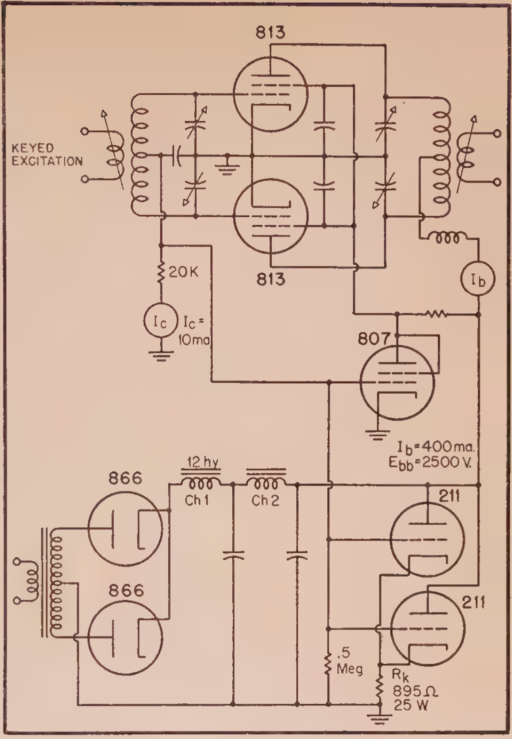


Fig. 3. Circuit of a typical final amplifier and power supply setup, illustrating one method of deriving the control voltage for the bleeder tubes.

A typical circuit including power supply and derived control voltage is given as a possible guide in *Fig. 3*; it is the basic layout again, with an arbitrary final. Assume a power supply delivering 2000 v. d.c. at 400 ma with an input choke of 12 henries.

From Eq. (2), bleeder current is 167 ma or more.

From Eq. (3), power dissipated will be 333 watts; this suggests a pair of 211s.

Cutoff bias will be about —170 volts, and the operating (key up) bias will be about —150 volts —easily provided by an R_k of 895 ohms at 25 watts. Initial adjustment of this system is best done with a variable R_1 in series with an ammeter to indicate the proper bleeder current, as given by Eq. (2).

The system which has been explained and described has been in use at W9KSQ since the power bug bit the OM. The circuit used is similar

(Continued on page 96)

ZC8PM Licks TVI!

PAT MILLER, ZC8PM/W2AIS*

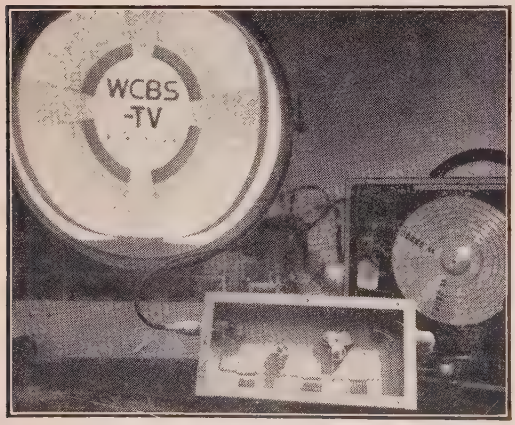
All persons, places and facts mentioned herein are strictly non-fictional, and resemblance to persons, places, and events is strictly intentional.

I'M NOT SURE whether it was the wolf packs on forty or the Arabs and Israelis taking potshots, but last February I decided I ought to go home to good old Gotham and enjoy a well-earned rest.

Getting back to my steam-heated hacienda was indeed a joy, and I proceeded to unlax and take life easy. But, sadly, I made one mistake—I turned on the ham rig and worked a couple of guys. Though this was a fatal error, I don't chide myself too much, since I little dreamed that during my brief six months in Palestine the whole pattern of life back home had changed. *Television had come of age!*

If I had had my wits about me, I would have thought something was odd when I went up on the roof to check the poles that support my aged Hertz. The roof was littered with strange looking aluminum devices, but I dismissed them as being nothing more than aviaries constructed by the local 53rd Street Bird Lovers. Being a bit nearsighted, I did not notice the 300-ohm feedline hooked to each of these strange beasties.

Well, gang, within 24 hours my door was knocked on and opened to a tense, angry woman who screamed, "You are ruining Kukla, Fran, and Ollie." "Madame," I sighed, "you flatter me. . . . So far I've only managed to ruin one at a time. Why not come in and tell me about these gals?" She heaved her ample bosom, flushed a deeper hue, and blurted, "Look, young man, don't be fresh. You're ruining my television set, and if you don't do something about it I'll". . . . Well, multiply this peeved babe by ten and you can soon see I was wishing that I was back in peaceful, quiet Arab Palestine where my only QRM was the camels trying to eat the coax.



The bottom plate has been removed from the filter to give us an idea of how it's laid out. The signal generator at the right was putting out sufficient signal to swamp the TV screen completely when the filter was not included in the circuit. With the filter in place, it was impossible to detect any interference on the TV screen, regardless of either the frequency or the amount of signal being piped from the signal generator.

I decided the first thing was to call some of my friends and see what they were doing. The first one who answered the phone welcomed me back home, and, in response to my query about TVI, said sadly that he had sold his gear and bought a television set. Another told me he went to bed after supper and got up at 0400. A third answered my letter and told me *his* cure was a simple one. He had the phone taken out and put a double lock on the door.

All of this struck me as being a rather negative approach, so I started to read through the issues of *CQ* that had arrived in my absence. Sure enough, there were plenty of articles about TVI, its causes and cures. But most of the articles were either too technical or assumed that I had access to the tool shop at Willow Run. From this plethora of material I did manage to squeeze out a few practical facts, such as: install line filters, make your buffers and doublers high *C*, shield, and shield some more. I did all of this, including plugging up some holes, made in mistaken zeal, with some tin foil from old Chesterfield cigarette packages. These efforts helped a bit, as two of my complainants no longer saw me CQ. But the other eight had banded together, and I was definitely forced to QRT.

One day I was tuning around on eleven (of all places!) and overheard W2GX on phone. "Brave man!" thought I until I heard him tell of his TVI-proof rig. I thought "if he can, why not I?" I picked up the phone and called him.

He turned out to be a swell guy. He mailed me a schematic with ample details as to size and type of components and where to buy them. As you can see from the diagram, it's a simple gadget despite the fearsome title "*M*-derived filter." It can be built very easily and fits into a small space. The chassis I built it on is only 4½ by 9½ by 2. One precaution though, use ceramic type condensers only. Even the highest class micas tend to have some inductive reactance. This little device is designed to work with 72 ohms in and out. With

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New York 19, N. Y.

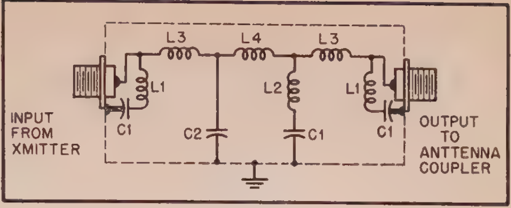
is in mind, I proceeded to revise my pi network late tank and make it a single-ended affair which link-coupled to the filter. On the other end I ran me coax to a tuning house link coupled to a egular parallel resonant circuit which fed the ertz.

Well, I fired up the rig again and started to SO a few folks when the phone rang. . . . I as still busting up TV. With an air of defeat, I oned W2GX once again. I told him of my efforts d the changes I had made and waited ruefully r his reaction. He said "Pat, I wish you had ld me that you had a pi net in the plate tank. could have saved you a lot of trouble. Mind you, ere is nothing wrong with the change you made. 's probably a case of the coax radiating. But anyay, restore your pi, rip out the link, and add apacity on the antenna end of the pi until you atch 72 ohms. A 180-$\mu\mu$f variable and a pair of 0-$\mu\mu$f ceramics on a good switch should enable ou to find 72 ohms on most every ham band." Vell, I did what the old maestro told me to do, nd doggone if it didn't work!

What a pleasure it was to get on forty once gain. In the middle of the evening I had the band myself. Everyone was QRT except the Europeans, a few cloverkickers and me. Lovely!

I should have let things go as they were, but, eing a mental hot-rod, I called up W2GX and sked him to write an article about his wonder lter. To this he said, "Look, Pat, I hate to write. Why don't you write it?" I said, "Ok, Russ, will o—if you let me give you a plug." He okehed the dea, and I rolled up my sleeves to write the squib, ut my sixth sense gave me pause. I realized that e remarks made by Russ regarding the filter ere very optimistic. For example, he had said at the filter's insertion loss was about three nths of a db, that it was fairly flat through the am spectrum and started to fall off around 38 egs where it dropped steeply to 40 megs, where e attenuation was about 75 db. From there on, p through the television spectrum, the attenuation emained fairly constant, varying only a few db. Vell, the gadget had killed *my* TVI, but still those laims were really something that ought to be ecked before being put in print.

Having a non-ham friend who was loaded down ith test equipment and a television set, I decided o ask him to check on Russ' claims. In the process f testing, we inserted the filter between the antenna osts of the TV set and an r.f. signal generator hat was delivering a couple of volts on 54 megaycles. As you can see from the illustration, the lter has effectively attenuated the generator output. My non-ham friend, while going through his ests, explained that a db in the r.f. range was a ather nebulous thing and pretty much depended n who was using what test equipment. With this eservation, he came up with the following findngs. He said, "Tell W2GX that I substantially gree with his findings. This simple little filter eally works. The cutoff characteristic is quite ronounced and near the frequency he claims. Its egree of attenuation is marked and, though I can't say for sure whether it's 75 db, it's certainly sufficient for the intended application.

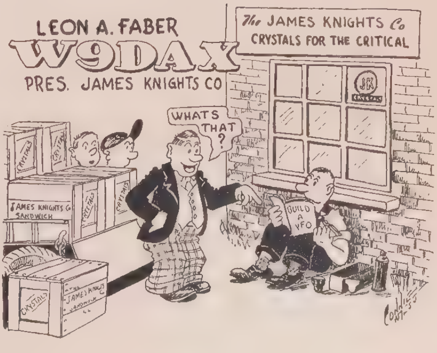


C1—50 $\mu\mu$f, non-inductive (CRL type 850S)
C2—150 $\mu\mu$f, non-inductive, (3 CRL type 850S)
L1—4 turns, ½-inch long, ½-inch winding form.
L2—4 turns, ½-inch long, 5/16-inch winding form.
L3—6 turns, ¾-inch long, ⅝-inch winding form.
L4—7 turns, 1-inch long, ⅝-inch winding form.
All of the above coils are self-supporting, wound on number 12 bare or enamelled wire.

Well, gang, if my fuddy-duddy experimenter thinks it's good, I'm sure it's good. This past summer and fall has found my home call W2AIS actively on the air at all hours. As far as I'm concerned, my TVI is cured, and those camels can eat up that old coax. Right now I wish there was less QRM at the box office where I'm trying to buy a couple of pasteboards to "South Pacific." However, the outlook is grim, so I guess I'll have to content myself with working the South Pacific on my TVI-free rig.

Editor's note—We called W2GX on the land line when this article came in, to determine the availability of the various components which Pat specified. Russ reports that Eldico of N. Y., 44-31 Douglaston Parkway, Douglaston, L. I., N. Y., is presently supplying the filter either in kit form or completely wired up. Eldico is also setting up a dealer arrangement in order to get better distribution for the kits, so your local parts supplier should have them soon. The following dealers are known to have the filters available at the present time: Harvey Radio Co., 103 West 43rd Street, N. Y. C., Walter Ashe Radio Co., 1125 Pine St., St. Louis, Mo., and Radio Distributing Co., 432 Carroll St., South Bend, Indiana.

Dollars for Watts



LEON A. FABER
W9DAX
PRES. JAMES KNIGHTS CO

For the NOVICE

Meet the Resistor

ROBERT L. ROD, W2KVY*

Resistors are frequently rather misunderstood critters which the beginning amateur takes fo granted. Let's really get acquainted with these familiar bits of carbon and wire

A VERY IMPORTANT phase of communications engineering is the selection of the best resistors and capacitors for the task at hand.

Resistors, as their name implies, are always used in electrical circuitry to resist current flow, and, therefore, in performing this function a certain amount of power is consumed, with a proportionate quantity of heat being liberated. The power generated in a circuit in which a resistor is used may be expressed in watts by the use of any one of the three following familiar expressions derived from Ohm's Law:

a) $P = EI$
b) $P = E^2/R$
c) $P = I^2R$

where:

E = Impressed EMF across the resistor, in volts
I = Current through the resistor, in amperes
R = Resistance, in ohms

In nature, all substances will resist current flow to some degree and, therefore, could be termed resistors. However, since their absolute resistance values often change with increasing time, as a steady current is impressed, most are unsuited for the precise requirements of electronics. In addition, the realization of large magnitudes of resistance cannot be practically achieved in small "packages" for the majority of substances. Hence the ideal resistor for radio work is small in size and free from random resistance changes with time, provided, of course, that the various ratings are not exceeded.

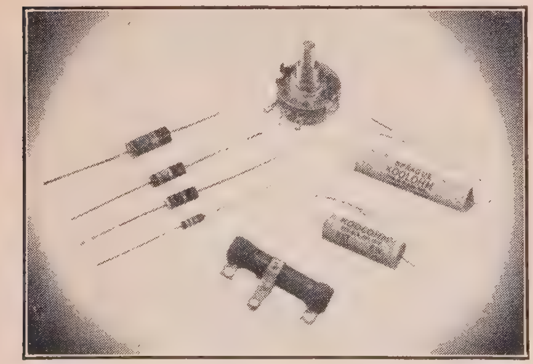


Figure I illustrates different sizes of fixed low-power resistors on the left, higher-power units at the right, and a variable resistor, or "potentiometer" in the back.

It becomes the responsibility of the designer to select resistors, using the above equations, which are not operated at more than the recommended wattage ratings specified by the manufacturers. To exceed the rated wattage is an open invitation to trouble, since excessive heat causes the resistive material to burn up or to suffer a large permanent change in specified resistance.

Most equipment designers incorporate a safety factor into their wattage requirements, the margin of safety being governed in large quantity production lots by the conflicting requirements of low cost and reliability. Fortunately, good commercial and amateur equipment design usually leaves plenty to spare, and there is little reason why home-built amateur equipment should do otherwise. Amateur gear should be created in the "conservative" manner for reasons quite obvious to anyone having experienced burnouts during contests and rag-chews.

To aid in the selection of resistors, the discussion will be broken into two broad classes, namely composition (including carbon) and wire-wound varieties. Composition resistors are now available having power ratings up to 5 watts while greater wattages dictate the use of wire-wound resistors.

Composition Resistors

Fixed — Fixed composition resistors are among the most familiar items in all electronic equipment. In the past few years we have seen ingenious engineering and manufacturing techniques evolve new types vastly superior to the bulky troublesome carbon resistors of twenty years ago. The changes have been so great that comparisons between old and new are difficult to make. Size has materially decreased, while wattage capabilities and reliability have been tremendously improved. Among the newer varieties are molded resistors made from composition materials completely surrounded by attractive insulation (*Fig. 1*). These resistors are produced in all standard Radio Manufacturing Association (RMA) values from several ohms to 22 megohms. Three different wattages are readily available, namely ½, 1, and 2, and each is considerably smaller than prewar sistors similarly rated. The manufacturer of the sistors illustrated in *Fig. 1* elaborates rather mpletely on the published ratings by stating at, at the maximum wattage rating, a resistor erating at an *ambient* temperature of 70° Cengrade for 1,000 hours will not change resistance more than 5%. The ambient temperature is e free air temperature surrounding the resistor. it is placed where air circulation is restricted d the ambient exceeds 70° C, the resistor should underrated for safety, the exact factor being verned by the aforementioned considerations of onomy and reliability. For general work, it is ell to use resistors rated at about twice the com-ted wattage, since the added cost is negligible.

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*145 East 49th Street, New York 17, N. Y.

Some composition resistors are larger than oth-s, depending upon the manufacturer. Extra size, ich may complicate wiring and chassis layout pecially in circuits using miniature tubes, is not vantageous, provided that the smaller unit is ted equally in wattage compared to the larger sistor under *similar* test conditions.

Several additional and important considerations ter the resistor picture other than wattage and e. These may appear unimportant to the occas-nal user of resistors, but extensive circuit work ickly brings to light the shortcomings of certain rieties. Leads, for example, should be sturdy ough to resist the abuse generally received; a ound pull must be sustained without damage by istors designed to meet Joint Army-Navy AN) Specifications. Further, leads should be -solder coated in manufacture so they readily e solder in wiring operations.[1]

The actual resistance value itself is a most im-tant factor, to say the least, since any circuit st necessarily use the nearest standard value to t computed in the design process, except in the e of extremely precise circuit applications. wever, most circuits are non-critical to the ex-t that a departure from a computed value of , 21,500 ohms to the nearest standard value of 000 ohms (abbreviated 22K under the present tem of conventional symbols and 22M under generally discarded absolete system) will do e to change performance. Since it is not usual to find the bargain counter variety of re-ors marked 22K (or any value for that matter) be off from the specified value by as much as % or ±6.6K in this case, considerable trouble ht conceivably arise, especially with voltage ders. Thus, resistance *tolerance* also enters picture along with all the other ratings. Most d resistors are available on the market with a 10% tolerance guaranteed, 5% being supplied xtra cost. Plate, cathode bias, and grid resis-, other than bias voltage dividers, normally are ered in the 10% or 20% tolerance by most pment designers; the 5% varieties finding great-se in critical circuits. When precision resistors required in amateur work the circuit is gen-ly so labeled.

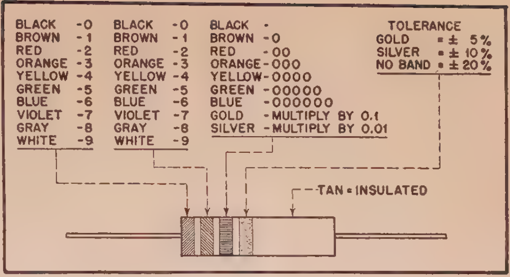

Fig. 2. This is how the RMA color code works.

Resistors are also rated by their manufacturers for maximum safe impressed voltage. Overrating resistors in voltage, even while operating *below* maximum power ratings, may quickly result in a burnout due to internal arcing with accompanying changes in resistance values. 350 volts is just about the maximum voltage to which a ½-watt resistor should be subjected, while 500 and 1,000 volts are the limits for 1 and 2 watters respectively. These figures are for the resistors illustrated in *Fig. 1.* Other varieties vary from these figures to some degree.

Since resistors, especially ½-watt varieties, are exceedingly small in size, it becomes difficult to mark the resistance value clearly on the surface in such a manner that permanence is assured. The Radio Manufacturers Association (RMA) has specified a system of color coding of resistors (and capacitors, incidentally) by means of three or four colored bands painted around the units. The RMA color code is explained in *Fig. 2.* Reading from the painted band closet to the end *inwards,* it is an easy matter to identify the resistance value. The 22K resistor mentioned earlier will be coded red-red-orange, corresponding to 2 (red) 2 (red) with 3 (orange) zeros as a multiplier. A fourth band designates the tolerance of the particular unit, while the use of tan as a body color indicates that an insulated case is used. A 15-ohm resistor will be coded brown-green-black, the black indicating an absence of any zeros following the 1 (brown) 5 (green). The leading brands of resistors use the RMA color code and also mark the resistance values and the wattage on the body as an added convenience to the user. Color blind persons find this feature of great assistance.

Having discussed fixed composition resistors, we will turn to variable composition resistors, better known as "pots" or potentiometers, to look into some of their salient features.

Variable—Early variable resistors were often wire wound, not because of power considerations but rather because the knowhow concerning the manufacture of good small carbon and composition "pots" was lacking. Fortunately, this deficiency has been corrected with the advent of new fabricating techniques, and pots are now less troublesome than ever before.

Basically a pot consists of some resistive substance mounted in a circular fashion, having a sliding tap moving over the resistance itself. Newer versions use a single composition material to serve as both base and resistance element itself, while others use a separate insulating base with an applied coating of resistive material (usually carbon in an adhesive binder) deposited on top. The composition pot is usually capable of greater heat dissipation than that realized with the two-element type (of similar dimensions, of course) since heat developed is rapidly carried away in the one-piece pot.

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[1] facilitate solder flow and speed up construction, rape leads lightly before wiring.

A rather thick resistance element should be used when one considers that a pot may experience many thousand cycles during its life (a cycle being a complete rotation of the shaft in one direction and back again) and that the slider will thus wear down the element somewhat. Relaxing the slider pressure on the element is one cure for wear which can be realized at the expense of the good contact so necessary for noise-free electrical performance. Since most pot manufacturers support the shaft and the attached slider by but one bearing, a good contact is not always present. A step forward is a recently announced pot having the shaft supported at two points, thus helping to keep the slider pressure constant.

A few points of additional interest concerning pots are worthy of mention. Not all pots change resistance in direct proportion to angular shaft rotation. Some experience great resistance changes during the first few degrees of rotation and taper off gradually thereafter and vice versa. This feature is purposely included to accommodate circuits requiring a non-linear voltage change to secure a desired over-all response. The "taper" of any pot is graphically illustrated in data sheets published by the manufacturers, and many versions are available. For general work, it seems advisable to recommend the use of the easily obtained "linear" taper offering resistance change directly proportional to angular shaft movement. For audio work however a control with an "audio taper" must be used to allow smooth volume control.

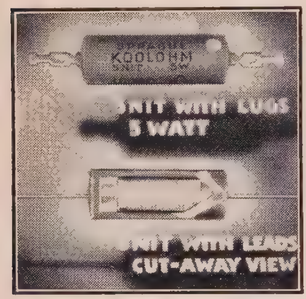


Fig. 3. A 5-watt wire-wound unit, illustrating how the insulating coating protects the resistive element.

The usual resistor ratings specifying maximum power and voltage hold for pots as well, and, in addition, one may order a pot in several tolerance values, the most readily available usually being 20%. Color coding is not used for pots, since the actual resistance value is usually marked on the case. Unfortunately, some pots are unmarked in resistance values as some manufacturers use a private code number.

Wire Wound Resistors

Fixed—When it is necessary to use a sing resistor in a circuit where the power will excee two or more watts, general practice dictates th use of a wire wound resistor. The main reaso for this stems from the inability of carbon an composition resistors to radiate satisfactorily larg quantities of excess heat. A resistor made usin a winding of sufficiently large gauge high resis ance wire can be fashioned to spread the co over a large volume, thus improving cooling cor siderably.

Since wire wound resistors are generally seale into protective ceramic or other insulation afte winding, few are acquainted with their actua "innards". Several points are of interest, the fina being that most wire-wound resistors are ***inductiv*** since the winding is in reality a small coil. A higher frequencies the inductance of ordinar wire-wound resistors can become objectionabl when they are used in r.f. circuits. For suc applications it is advisable to use one of the severa varieties of *non-inductive* wire-wound resistor *Fig. 3.* "Non-inductive" means that a good part the inductance has been canceled out by the us of a criss-cross winding process. It should mentioned that carbon and composition resisto have a negligible amount of inductance, even le than the special non-inductive wire-wound version

Small wirewound resistors in the 5 and 10-wa classes, especially those having resistances excee ing 10K, often are extremely close-wound wi wire having a diameter of 1 or 2 mils (1 mil .001 inch). Great pains are taken by the vario manufacturers to prevent shorting between the very closely spaced turns. Further pains are tak to prevent moisture from attacking the wire itse thus opening the door to the not unfamiliar a noyance of an "open" resistor. Long performan life is most important for wire-wound resisto since they are oftern used in protective high volta bleeder applications where an open circuit can me instant death.

When selecting wire-wound resistors, especial those having large resistances, it pays to play sa by selecting wattages at least twice those compute Such precaution insures that larger wire than ne essary will be present.

Note that some brands may conveniently mounted with their insulated bodies resting direct upon grounded metal and that others require mou ing above the chassis using brackets which a generally supplied. A variety of terminal arrang ments and body shapes are available on the mar so that the experimentor may obtain almost a desired mounting. Remember that regardless brand, all wire-wound resistors need cooling a Locate them not in tight corners of a chassis out in a clear space where adequate air circulati is present.

Variable—Wire-wound resistors may be p chased in two variable forms. The first type i modified fixed wire-wound resistor having an ad

(Continued on page

For the TECHNICIAN

Build an Audio Oscillator

CHARLES WELCH, W5MHK*

he Beat-frequency type audio oscillator has several advantages over the R/C type. Here's ow to build one which can solve many problems you've been facing either in shack or lab.

THERE HAVE BEEN MANY ARTICLES published on various audio oscillators designed for home onstruction, but the emphasis has come to be placed n R/C circuits almost to the point of completely noring the beat frequency type oscillator. Actually, is type is very well suited to home construction, d its excellent operating characteristics equal or rpass those of other types.

It is entirely feasible to build such an oscillator ith an output flat within a few db over the entire dio range and distortion so low as to be negli-ble. Another operating advantage is the fact that e entire range of the oscillator is covered by a ngle sweep of the tuning control without the use of nge switches or multipliers. These excellent char-teristics, together with the fact that an old super-terodyne receiver can supply all the parts needed, akes the beat frequency audio oscillator practically eally suited to the experimenter's needs.

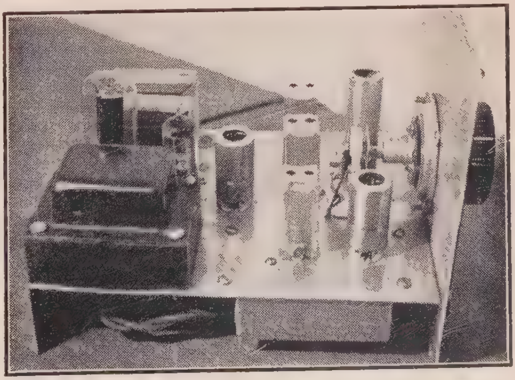
The theory of operation is quite simple. The tput of a fixed-frequency r.f. oscillator operating , for example, 200 kc, is fed to the detector, where is beat against the output of a second oscillator erating on, say, 201 kc. The difference frequency pears at the output of the detector stage as a 00-cycle audio signal. Then, by varying the fre-ency of the second oscillator over a relatively rrow band, it is possible to produce audio beat quencies which cover the entire range. This is actly the same process which takes place at the .o.—second-detector section of a superheterodyne eiver adjusted to receive c.w. signals. Therefore, is quite possible to build such an oscillator from eiver parts, using i.f. transformers as oscillator ls and the second-detector, first-audio stage for rest of the instrument.

There are, however, certain precautions which st be observed if a reliable instrument is to ult. The importance of mechanical rigidity can- be stressed too highly. A sturdy chassis must used and all the components mounted solidly. condensers and resistors must be secured to tie-nts. This is especially true in the oscillator uits.

Also of primary importance is adequate shielding. two oscillators must be isolated as completely as possible, for, since they operate on closely adjacent frequencies, there will be a natural tendency to "lock in" and operate on the same frequency, thereby producing no audio beat. For mechanical reasons it is usually easier to shield the fixed-frequency oscillator completely and to include decoupling in the plate leads of both oscillators. Even with elaborate shielding, however, the oscillators will tend to lock in as they approach very near the zero-beat point, since the output of the two is effectively connected together at the detector stage and there will always be a certain amount of interaction there. In the oscillator described, this locking-in point occurs well below a hundred cycles. It was decided that, for average applications, the lower frequencies were not too useful anyway—so it was left that way, rather than go to the additional trouble necessary to correct this. If these lower frequencies are desired, it will be necessary to isolate one of the oscillators further by the use of a Class A buffer stage between it and the detector.

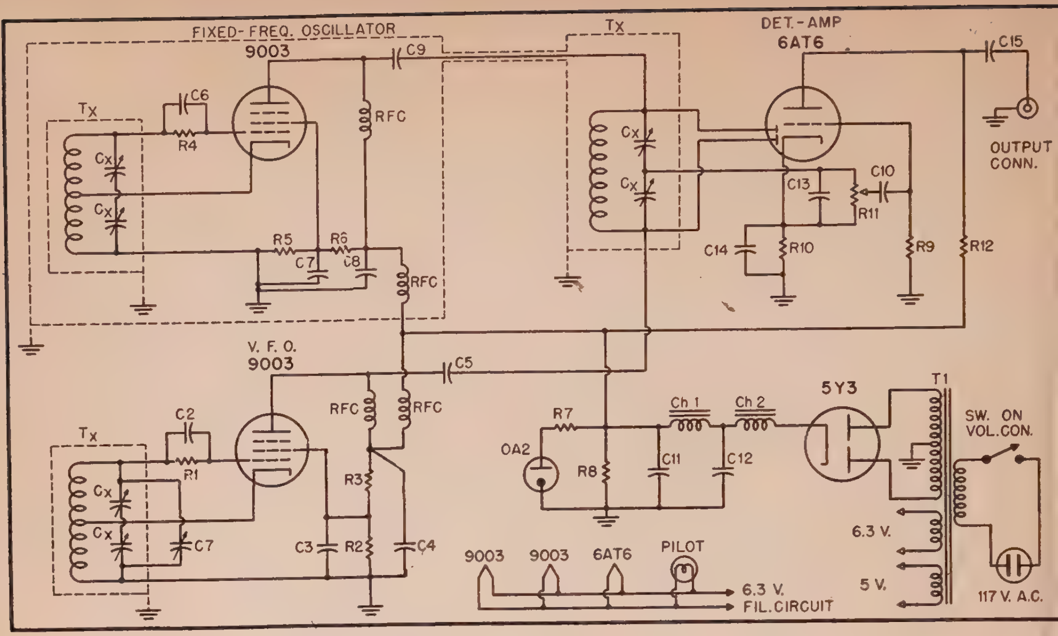
Design Factors

There are also certain design factors which must be borne in mind. The choice of oscillator frequency is one. It can readily be seen that too high a frequency would result in an oscillator more liable to instability, since slight variations in capacity, etc., would produce greater variations in frequency. On the other hand, the frequency must not be too



The side view of the combleted beat-frequency type audio oscillator. It's as easy to build as it looks!

15½ So. Jenkins, Norman, Oklahoma



C1—variable condenser (see text)
C2, C6, C13—.0001 μfd mica
C3, C7, C10—.01 paper
C4, C5, C8, C15—.001 mica
C11, C12—12 μfd 250 v. electrolytic
C9—.00005 mica
C14—.5 μfd, 100 v.
C_x—trimmers in i.f. transformers
R1, R4—1 meg.
R2, R5—20,000 ohms
R3, R6—6800 ohms
R7—5600 ohms, 2 w.
R8—56,000 ohms, 2 w.
R9—2.2 meg.
R10—10,000 ohms
R11—500,000-ohm potentiometer, a.c. switch
R12—270,000 ohms
T1—power transformer, 300-0-300 @ 50 ma & 6.3
5.0 v. a.c. fil. windings
T_x—455-kc miniature i.f. transformers (see text)
Ch1, Ch2—50-ma, 8.5 Hy chokes
All resistors ½ w. unless otherwise noted.
All condensers 250-v. rating unless otherwise noted.

low, or the variable oscillator would have to vary over a proportionately large range in order to cover the audio frequencies. 100 to 350 kc seems to be the range which offers the best compromise of these factors. It is also desirable to choose an oscillator circuit which is inherently stable; thus, the electron coupled oscillator is used almost universally. Harmonics, if present, must be eliminated, since they, too, can produce beats in the output. This can be done by using a tuned circuit to filter them from the output of the fixed oscillator, or by a balanced detector circuit. This will eliminate the second harmonic, which is by far the greatest offender. In order to minimize distortion at the detector, it is customary to use a linear detector and to feed the two r.f. signals at different levels, the higher level being several times as great as the other. Keeping these facts in mind and using normal practices of good construction, you should run into no great trouble in designing and building a beat frequency type oscillator.

Turning to more specific cases, consider the oscillator shown in the photographs. This unit has a usable range of 100 to 15,000 cycles. The distortion over the entire range does not exceed 2.5%. Actually, from 1000 cycles up, the distortion does not exceed 0.2%. The output is flat within 3 db over the entire range. Here, again, most of the vari
tion comes below 1000 cycles. It is, of course, qui
possible to better these figures, but, as it w
desired to keep the circuit as simple as possible a
deviate as little as possible from standard receiv
parts and circuits, it was decided to compromise
the performance figures given.

Chassis and Layout

Begin the construction by mounting all the pa
on a good, solid chassis. It is advisable to use
larger chassis that that shown in the photograph
as this one was quite crowded. When all the pa
are mounted, begin by wiring the power supp
The regulated output should be 180 volts d.c.,
though some error is allowable. When the pow
supply is completed and tested, wire all the fi
ments before starting further wiring.

The Fixed-Frequency Oscillator

The tube used in the fixed-frequency oscilla
is the miniature 9003. The oscillator coil is
modified miniature 455-kc i.f. transformer. It
best to use the spade-bolt mounting transformer,
the other types do not offer very rigid mounti
a necessity which cannot be overemphasized.
modify the transformers, remove the shield can
observe the direction of the windings. Find
lower end of the upper coil and the upper end

e lower coil, remove them from their connections the trimmers, and tie them together. Attach lead to this junction, which is now the center tap the coil. Then tie the two unused trimmer con- ctions together. This will change the circuit om two tuned circuits to a single, center-tapped il with two series-connected condensers across it. or further clarification on this modification, see ig. 1. The center tap of the coil is used for the thode tap of the electron coupled oscillator. For otimum stability, this tap should be located from ne-fifth to one-third of the way up the coil, but is simple method was found satisfactory in the iginal oscillator. If, however, frequency instabil- y should crop up, it would be advisable to remove ne-half or more of the lower section of the coil, ereby effectively lowering the tap.

In wiring the oscillator, use plenty of tie points nd anchor all resistors firmly so that they cannot ove under vibration or shock. A shield must be sed over the tube, and the entire circuit under the hassis must be enclosed in a shield box. The out- ut is run in a shielded wire so that the circuit is ntirely bottled up except for the signal present at e end of the wire. Check with a neon bulb or a w frequency receiver to make sure the oscillator working, then move on to the next stage.

e Variable-Frequency Oscillator

This circuit is practically identical to the fixed- equency oscillator, and the layout as to resistor sition, etc., should be made as similar as possible the two will have similar heat-drift character- ics. The main difference lies in the variable con- nser C_1, which is the tuning control. This is a niature condenser similar to the Hammarlund PC series, with all the plates removed except one tor and one stator plate. This condenser must driven by a vernier dial in order to obtain ade- ate bandspread. A National SCN was used on e original and found very satisfactory. When the ring of this second oscillator is completed, check see that it is oscillating. Then, using a BC-348 other low-frequency receiver to monitor the cillators, bring them into zero-beat by adjusting trimmers on the coils. The tuning condenser of VFO should be in full mesh when the oscillators at zero beat. It will now be possible to swing VFO through its full bandwidth and listen to resulting beats on the receiver. Incidentally, with fixed-frequency oscillator shielded as described, will probably be necessary to couple the receiver enna to the output lead in order to hear the nal. If the range of the VFO is not adequate to er the range desired, raise the frequency of both illators. If too wide, lower the frequency. In original oscillator, 310 kc was found best from s standpoint. Check the oscillators for mechan- l rigidity by striking sharp blows on the work- ch and listening for frequency variation. Remem- to take in account the fact that if the receiver also on the bench some variation will probably w up there due to the shocks. When these steps e been completed, wire up the detector-amplifier ge.

The Detector-Amplifier Stage

The detector circuit is admittedly a freak. It was originally decided to build a balanced-detector, but it was hooked up as shown in order to avoid further modification of the i.f. transformer. It has been found quite satisfactory as shown. The tube in this stage is a 6AT6 diode-triode, and the modification of the i.f. transformer is similar to the others except that the midpoint of the two series condensers is brought out on a lead instead of the coil center tap. Aside from the modifications at the coil end of the detector circuit, the detector-amplifier circuit is something right out of a superhet receiver, so no difficulty should be encountered here. When the stage has been wired, hook up the outputs of the oscillators as shown in the schematic.

Testing and Adjusment

Connect a pair of high-impedance headphones to the output and adjust the trimmers of the detector coil until the signal is loudest. If possible, observe the output on an oscilloscope now, and if there is any visible distortion of the output wave, it may be balanced out by careful adjustment of the trimmers on the detector coil. It may be found that the point where the distortion is lowest will not coincide with the point of highest signal. The output of the oscillator will still be high enough for any normal applications, however. When the wave looks good on the scope, it will have low enough distortion content for most uses. If yours are more exacting requirements, a few moments spent in checking with a distortion analyzer and touching up the trimmer adjustments will lower the distortion even more.

If the circuit is reproduced faithfully, the output should be essentially flat, and the noise level will be well below the signal. If, however, either frequency distortion or noise should be present, these troubles may be corrected by applying normal corrective measures to the audio amplifier stage. The unit must be operated in a metal case, or stray pickup may cause quite a lot of noise. Information on the calibration of audio oscillators is so universally available as to make its repetition here unnecessary.

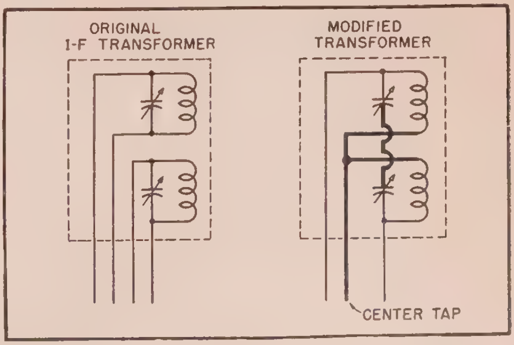


Fig. 1. A slight modification of a standard 455-kc i.f. transformer is necessary to provide proper tank and feedback constants for the r.f. oscillators.

The Easy Way

R. W. EHRLICH, W2NJR*

Much of the difficulty — and expense — of building a grid-dip oscillator can be side stepped by using a tried and proven absorption-type wavemeter as a foundation uni

It should not be neccessary to enumerate here the many useful purposes a grid-dip oscillator can serve in the modern amateur station. Its utility as a resonance spotter, wavemeter, oscillator, etc., has been thoroughly discussed in recent articles. Unfortunately, however, the majority of amateurs are not equipped with this useful little device, either because of the somewhat involved mechanical problems in building one, or due to the substantial expense of the commercial product.

The grid-dip oscillator described here is both inexpensive and easy to build. The cost of parts for the complete oscillator assembly is less than five dollars, and its construction requires only a few hours' time. This unit can be cabled to any available power supply and meter to complete the instrument in its simplest version or, if desired, a self-contained meter and supply can be added a illustrated herewith. These economies of time an money come about by using, as a foundation element, the *Silver Model 903 Wavemeter,* an inexpensive device that has already found its way int many a ham shack. Construction of the grid-di oscillator then became simply a matter of adding simple tube circuit, meter, and power supply.

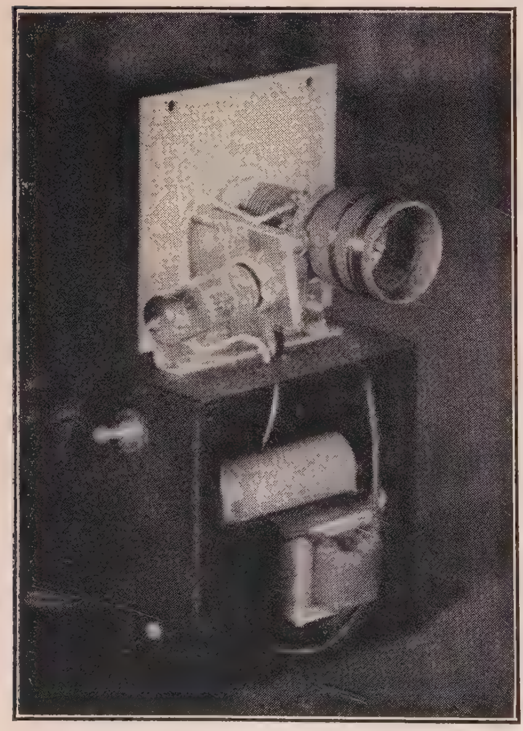


Fig. 1. Rear view of the simplified g.d.o. The tube is mounted on a small bracket attached to the wavemeter frame.

Circuit-wise, this grid-dip oscillator is not ur usual. It is a simple grid-tuned circuit in whic the small pick-up winding already on the wavemete coil is utilized as a tickler in the plate circuit t induce oscillation. The original calibration of th instrument is affected somewhat by the additiona tube capacity; however, this calibration may b easily restored, as will be discussed later, and it not necessary to go through an entire recalibratio process.

Construction

Construction of the oscillator is generally covere in the photographs and diagrams. The tube mounted on a small bracket about 1½" square. Or edge of the bracket is bent and drilled so that may be fastened to one of the screws holding th coil socket. (A scrapped aluminum-base transcription disk makes a convenient material for th bracket.)

It has been noted that some of the *Silver* wavemeters differ in respect to which of the two co pins (Nos. 4 and 5) is connected to the rotor, depending on how the tuning condenser happened t be made. In order that the rotor may always b operated on the grounded side of the circuit, tw combinations of coil socket connections are show in *Fig. 3.*

Circuit component values are not critical, b they should be of good quality. The plate bypa condenser should be small in size so that it wi not add capacity to ground by virtue of its proxim ty to other parts of the circuit, and also so that may form a short direct connection between tw of the pins on the coil socket. The unit illustrate uses a flat, circular-shaped capacitor which is use extensively in television set manufacture.

As it is wired, the socket will accommodate eith a 6C4 or a 6J6 as the oscillator. The former cheaper and has less filament drain, but it do not oscillate well on frequencies in the 2-met range. On lower bands, either tube may be use

Any power supply that will deliver 100 volts 10 ma and 6.3 volts at .45 amp may be used. If self-contained power supply is built for this instr ment, it is strongly recommended that an isolati

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*21 Glenview Drive, West Orange, N. J.

ig. 2. The simplified grid-dip oscillator with self-contained power supply and meter.

ransformer of some sort be used rather than a mple a.c.-d.c. arrangement, to prevent accidental horts to ground and possible shock. Two transormer arrangements are shown in *Fig.* 4. When he power supply voltage exceeds 100 volts, resisor *R* should have a value of about 1000 ohms for ach ten volts of difference, although some adjustment in this value may be desired, as described elow.

hecking and Calibration

The first operating check is to turn the unit on nd see that oscillations are obtained over the full nge of each coil and that the needle does not go ff scale. All coil ranges should be tried except oil #105 (100-300 mc), which must be treated parately. If necessary, readjust the plate dropping sistor so that the highest reading of grid current on any coil is not quite off-scale on the meter. n the experimental unit, the correct operating ltage was found to be 100 volts, and the meter ould then just tend to go off-scale near the top coil #104 at about 70 mc.

The next check is to see that the oscillations are an and that there is no superregeneration or quegging." To make this check, tune your receiver about the middle of each coil range and, with appropriate coil in place, tune the oscillator er its range. (Again omit coil #105.) Several ponses will probably be heard, including the ndamental, image, and, possibly, some harmonic ponses. It should be noted, however, that there ould be no rushing sound experienced, nor ould there be a "cascade" of responses within a v kc of each other. In the event that these characistics are experienced, reduce the value of the d leak condenser or resistor by a small amount.

Due to the added capacity of the tube, there will a change in the calibration of the meter. Fortunately, the added capacity is a fixed amount, and the change is always represented by a certain number of degrees of condenser rotation. The exact number of degrees may be found by listening at, say, 14 mc and 28 mc on the communication receiver and adjusting the grid-dip oscillator (with appropriate coils in place) for reception of the signal. Both of these frequencies are now obtained at almost minimum capacitance, or about 20 degrees in error. The two angular errors should agree very closely, however. Care should be taken to ignore images and other spurious responses in the receiver.

Unfortunately, the two sets of scales on the wave-

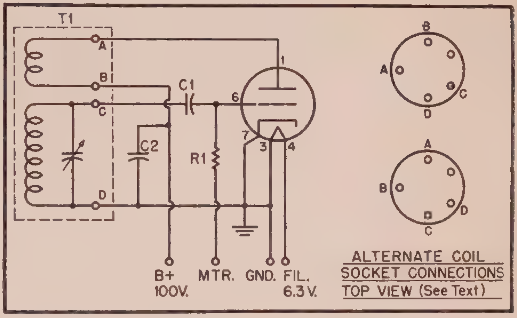


Fig. 3. Circuit diagram of the oscillator assembly. This unit may be cabled to an external power supply and meter, or to the unit illustrated in Fig. 4.

C1—15 $\mu\mu$f ceramic
C2—.005 μf ceramic (Centralab Disc Hi-Kap or equivalent)
R1—22K, ½ w.
T1—Silver Model 903 Wavemeter

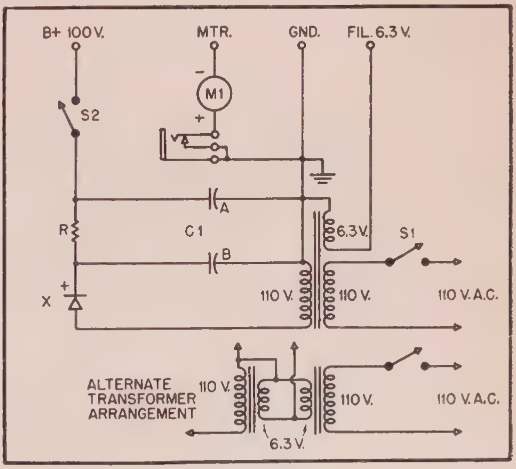


Fig. 4. A suggested power supply and meter circuit. The use of an isolating transformer is recommended.

C1—20-20 μf, 150 d.c. w.v.
R—See text
S1, S2—s.p.s.t. toggle switch
X—50 ma selenium rectifier
M1—0-1 d.c. miliammeter

meter are not calibrated in the same direction, so that the instrument cannot be recalibrated simply by shifting the knob on its shaft. Two pointers are required, one displaced clockwise and the other counterclockwise by the amount of error angle found above. One suggestion is to add two supplementary pointers, as illustrated in *Fig.* 5, but the individual builder can use any scheme that he finds easiest to make. Even without a double pointer, suitable readings can usually be made.

Two-Meter Operation

Obviously, a certain portion of the high end of each coil range is lost due to the change in instrument calibration, notably the 7-mc band on the 3.5-8 mc coil. At the same time, however, each coil can now reach a lower frequency than before due to the greater capacitance. Some, but not all, of the missing frequencies can be made up by making special calibrations to cover these extensions of the lower range. For example, on the experimental unit, the highest frequency on the 3.5-9-mc coil is now 6.5 mc, but the 9-18-mc coil can be tuned as low as 7.3 mc. This coverage provides assurance that some tank circuit being measured which can cover both 6.5 and 7.3 mc will also hit 7 mc. If a particular coverage is required in some "lost" portion of the spectrum, however, a special coil can easily be made for the purpose.

As indicated previously, operation in the 2-meter spectrum requires special consideration. The regular 100-300-mc coil is not suitable for grid-dip operation because of feedback deficiencies and because the small inductance loops are so surrounded by the coil form that they cannot be coupled adequately to the circuit being measured. A special coil, illustrated in *Fig.* 6, was constructed for this range. The two loops are about ½" wide and 1" long, but the dimensions are not critical, for the new range must be calibrated separately anyway.

The same checks for oscillation and spurious emanations should be made on this band as described above for the others. Pushing the loops together will increase the ability of the circuit t oscillate, whereas they should be spread apart i signs of squegging or superregeneration are hear in the 2-meter receiver.

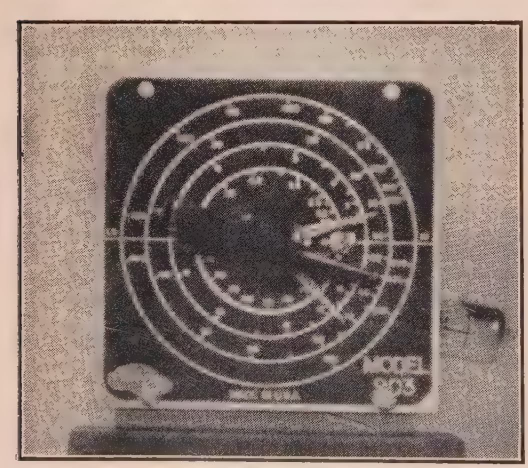


Fig. 5. Two supplementary pointers are added to recalibrate the instrument — one for each set of scales. This setting is for 14.5 or 69 mc.

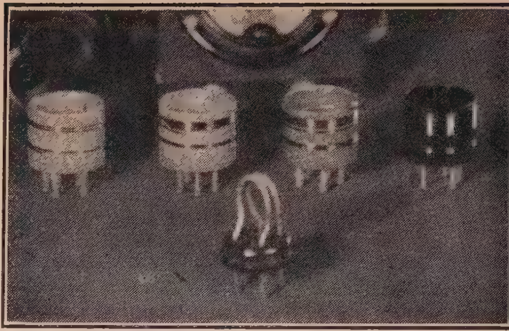


Fig. 6. Standard coils are used on all ranges excep 2 meters. A special coil, illustrated here, is made fo this band.

Calibration of the new band may be accomplished by means of Lecher wires with the assistanc of a 2-meter receiver. Several responses may b noted in the receiver, and caution should be exercised to disregard images. It will be noted tha oscillations and dips are both much weaker on thes frequencies, and the loop must be held very clos to the circuit under measurement. Such deficiencie are a natural consequence of using a circuit designe for the lower bands on such a high frequency.

Use of the grid-dip oscillator has been well cov ered in previous articles, but a few reminders migh be in order. The oscillator coil should be hel parallel to the coil of the circuit being measure and, for accurate readings, should be drawn awa from the measured circuit until the dips are jus perceptible. Transmitter tank circuits should b checked with all tubes and associated elements i place. When checking antennas for self-resonanc the oscillator should be held near a point wher high current is expected in the antenna.

With the plate supply turned off, the instrumen will serve as a wavemeter. A few watts of r. power are required for an indication, the sensitivit being about the same as the original instrumen with its lamp circuit.

A phone jack may be connected in series wit the meter. With plate voltage on, the instrume is a sensitive heterodyne detector, while with t B supply turned off, the phone connection may used for audio monitoring of transmitter output.

There is no doubt that this little grid-dip osci lator will serve plenty of useful purposes in a ham shack. Its simplicity and inexpensiveness co mend it to any amateur who will ever have to wi another coil or prune an antenna to frequency. is to be expected that other grid-dip oscillato which have been well designed and built from t ground up for this service may show improv performance in some respects, principally in ter of constancy of grid current. With careful ope tion and full familiarity with this instrument, ho ever, it can perform in excellent fashion.

Selenium Rectifiers

ROBERT B. RICHMOND, W1RRA*

t is not always safe to substitute a dry-disk rectifier for a conventional thermionic unit. Bob ichmond kept himself busy finding out "how come?" Add this to your stock of lab notes.

DURING THE LAST TWO YEARS what has appeared to be the answer to small low-power B supplies has een the miniature selenium rectifier. It has found ide use in voltage-doubler and half-wave rectifier rcuits, either operated directly from the 117-volt c. line, or through an isolation transformer. I ave heard some say that all one has to do is to eplace the rectifier tube with a selenium stack and rget about the power supply from then on. Unrtunately, this is not true, as the circuit paraeters are no longer the same.

The major change in the circuit is that of the rward resistance of the rectifier stack. Using a 0-milliampere selenium stack as an example, the oltage drop is but 6 to 8 volts, against 50 for a Y3G or 22 volts for a 6X5. This means there will e a very high peak alternating current flowing rough the voltage-doubling capacitors. It is the fect the high ripple current has on these dry ectrolytic capacitors that is of particular concern.

When the selenium stacks are used without a eak-limiting resistor of about 50 ohms, the alterating current flowing through the doubling capacirs is slightly more than twice the d.c. load curent. If a 50-ohm limiting resistor is used, as own in *Fig.* 1, the alternating current through e capacitors is about 1.75 times the d.c. load curent. This high current will cause excessive heating the electrolytics unless they are of adequate size. o find the safe limits for alternating current rough a dry electrolytic, it is best to refer to the anufacturer's catalog. One fact to keep in mind that the electrolyte of the higher voltage capacirs has a higher resistance than that of the lower oltage capacitors. The optimim d.c. working voltge rating for maximum alternating current ripple appears to be 150 volts. The limits run from 130 milliamperes for a 10-μf capacitor to 210 for a 50-μf capacitor. An increase or decrease in the d.c. working voltage rating of 150 volts will give a decrease in ability to handle alternating current.

A second and much more serious effect of high alternating current through the electrolytic capacitors is the decrease in capacitance that takes place with an increase in alternating current.

The electrolyte of a dry electrolytic capacitor has appreciable resistance, and there will be an alternating potential set up between the cathode plate and the dielectric film on the anode plate. For one half cycle the polarity of the cathode is negative with respect to the plate, and positive on the other half cycle. It is this latter condition that appears to cause most of the trouble with dry electrolytics when the alternating current ripple is high.

In most cases, the cathode is made of aluminum and is of a film-forming material. This means that, when the cathode is positive, it will acquire a dielectric film, the thickness of which will be proportional to the magnitude of the polarizing potential, which in turn is proportional to the ripple current.

As soon as the cathode acquires a dielectric film, the entire capacitor changes from the original polarized structure to a semi-polarized or non-polarized capacitor. This condition in effect is two capacitors in series with a resistor between them, and results in a new capacitance value which is equal to

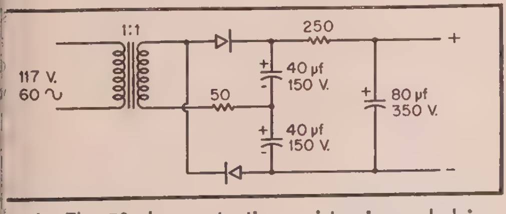
$$\frac{C_1C_2}{C_1+C_2}$$

where C_1 equals the mutual capacitance of the capacitor, the capacitance of the anode plate and the electrolyte, while C_2 represents the capacitance of the cathode plate and the electrolyte.

As the capacitance of an electrolytic capacitor is proportional to the surface of the anode, and the thickness of the dielectric film is proportional to the value of the anodic polarizing potential, the value of C_2 must be proportional to the value of the anodic polarizing potential applied to the plate. From this it is evident that, as the ripple current increases, the polarizing potential applied to the cathode plate will increase and the value of C_2 will decrease, resulting in a decrease of the overall capacitance of the entire structure.

There are two methods for stabilizing dry elec-

(Continued on page 41)



g. 1. The 50-ohm protective resistor is needed in a ltage-doubling rectifier circuit to compensate for e low forward resistance of the dry-disk rectifier when electrolytic filter condensers are used.

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.

Stay Out of Jail

FORD L. McGRAW, W6STS*

For some unacccountable reason the use of a monitor has gone out of style. Frankly, we wouldn't try to get on the air without one. If you're tired of RST-prevaricators among those you QSO, build this simple unit and be sure.

OF THE MANY CONVERSIONS and adaptations to which the 274-N command receivers have been put, we believe our conversion of a BC-454-B as a station monitor to be one of the easiest, most useful, and economical. Every amateur phone station should be monitored by its operator when first going on the air, and, at least periodically, during an evening of QSOs. Even the most experienced code operator likes to monitor his sending at times, while the beginning c.w. man will probably want to, or at least should, monitor continually. The BC-454-B is a natural for this purpose. About two hours of your time and the price of the receiver, plus the cost of one open circuit jack, one 20,000-ohm pot (with switch), one s.p.s.t. (BFO) switch, and one d.p.d.t. (B+) switch, are all that's required. It was found that by tuning the receiver to a transmitter sub-harmonic, it could be used on 80 through 10. It will usually be found unnecessary to use any antenna on the monitor. When using the BC-454 on the 80-meter band, the antenna post may be tied directly to the chassis to reduce pickup.

Conversion Procedure

Remove all hardware from the adapter panel and mount the pot, phone jack, and BFO switch, as shown in *Fig.* 1. Ground one side of the pot the panel and connect the center tap to *pin 1* on Use stranded wire about 4 inches long for the panel connections. Wire the phone jack to *pin* on J_1. Ground one side of the BFO switch a connect the other side to *pin 5* on J_1. These co nections may be soldered directly to the pin ti on J_1. Solder two wires to the switch on the volu control pot and connect to *pins 6* and *7* on J_1 Th completes the front-end changes, and the adapt panel may now be replaced on the front panel.

Next, remove the bottom cover. Remove the tw side screws that hold the coil assembly in plac Pulling out the coil assembly is necessary in ord to permit working on the rear side of J_1. Unsold the two white wires attached to *pins 6* and *7* on t rear side of J_1, and remove completely from t set. Remove the small r.f. choke L_{14} and the auc choke L_{15}. A couple of tie-points are bolted to t chassis for mounting the filament-dropping resist in the space vacated by L_{15}. As we were unable secure any male plugs to fit J_3, it was decided remove it and replace with a standard Amphe 86-PM8. Slight reaming of the hole with a pock knife is necessary to admit the Amphenol plug. A leads unsoldered from J_3 may be removed to th nearest point of contact except the long red le from *pin 4* on J_3. This lead is clipped just lo enough to reach the point where the short red le is removed. This is the point where the 5100-oh resistor is tied to C15-C. As may be seen on t diagram *Fig. 2*, the audio output is brought to *5* on J_4, the B+ to *pin 4* on J_4, and *pin 3* grounded to the chassis.

The next step is to rewire the filaments, shown on the diagram, *Fig. 2*. In rewiring t filaments it will be found easiest to start with *7* on the 12SR7 and proceed around the circuit shown. In this manner the original filament wi may be used to the best advantage. The a.c. wi running to the filament switch should be a shield twisted pair with the shield grounded to preve possible hum induction to the receiver.

Use as a C.W. Monitor

When the receiver is being used to monitor c. the output may be connected to a small speaker placing a 4000-ohm-to-voice coil transformer tween the speaker output on *pin 5* and the vo coil, as shown on the diagram. A switch must added in series with the transformer to kill speaker when monitoring with the phones. T speaker transformer may be mounted on the dy motor deck or at the speaker.

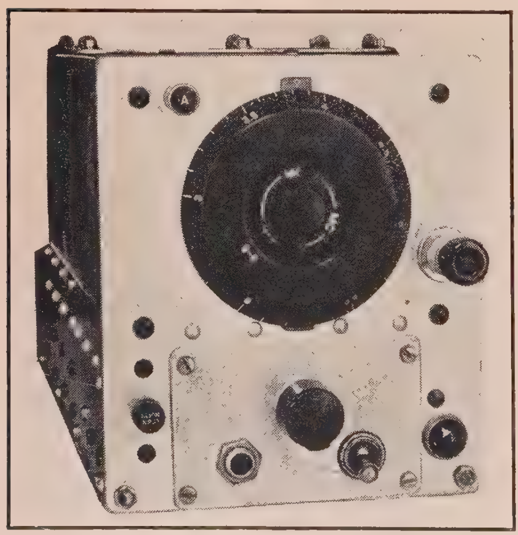


Fig. 1. From the front it looks like any other SCR-274N conversion.

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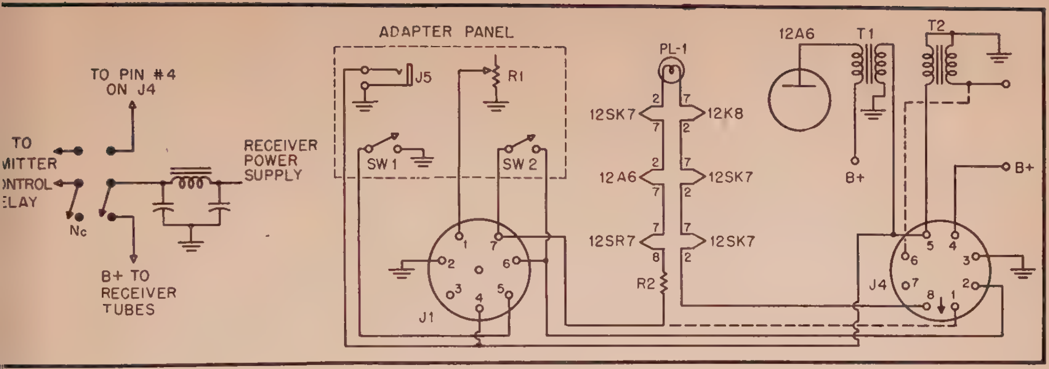
*2021 Allesandro St., Los Angeles, Calif.



—Amphenol 86-PM8.
—open ckt. jack for phones.
l—6 v., 250-ma series pilot light.
—20K volume control.
—250 ohms, 10 w.
SW1—b.f.o. control switch.
SW2—filament switch (on R1).
SW3—d.p.d.t. monitor B+ switch (see text).
T1—output transformer in monitor.
T2—speaker trans. (50L6-to v.c. trans.)

To prevent leaving the filaments turned on by istake when using the monitor, a pilot light must added. The small 3-μfd. condenser mounted on e front panel may be moved far enough up to ake room for a small pilot light. If the pilot light wired in series with the filaments as shown on e diagram, a 250-mil 6-volt bulb should be used. he 150-mil bulbs will not stand the current surge hich occurs when the filaments are first turned on. he 250-mil bulbs will last many months and give enty of light for the purpose. Some may prefer use a 110-volt neon pilot light instead.

As the writer has several of the 274-N receivers ound the shack used in various manners, the tput plugs were standardized with the Amphenol pin plugs. The wires shown by the dotted lines were incorporated to permit turning on the receiver B supply with the filament switch when individual power supplies are used on the various receivers. It was shown here with the thought in mind that some operators might prefer to use a small power supply for the monitor, or it may be utilized to control the transmitter filament relay from the operating desk, as we are using it here.

The B+ for the monitor is taken from the station communications receiver B supply, as shown by the diagram. The other half of the d.p.d.t. switch is used to control the transmitter high voltage relay. Thus the station receiver is killed and the monitor and transmitter are turned on with one switch. This switch may be located at any spot handy to the operating position.

MEET THE RESISTOR

(from page 26)

sliding contact touching a section of exposed sistance element, thus allowing the selection of y part of the total over-all resistance. Slider rsions are rather useful in circuitry requiring frequent adjustments, since the slider itself, hen frequently moved over the small diameter ire, tends to wear out the resistance element. his, coupled with the aforementioned disadvange of having the resistance wire exposed in part air and moisture, tends to identify slider-type ire-wound resistors as slightly less reliable from life standpoint. Sometimes the resistor is so ired into a circuit to place the slider itself at me voltage potential with respect to ground, ereby introducing a shock hazard to anyone atmpting an adjustment with power on. Taking ese factors into consideration, the designer must so use the same precautions concerning wire size d cooling as apply to fixed wire-wound resistors. hen adjusting the slider on a variable resistor eat care should be exercised to avoid damaging e winding. The slider should be fully loosened fore each move.

The wire-wound rheostats and potentiometers constituting the second form of variable wire resistors are used when large wattages, usually more than 2 watts, are being dissipated. Designed for use in circuits frequently needing adjustments, they are ideally suited for all but certain applications where the jump in resistance as the slider passes from turn to turn proves to be a source of electrical noise. Note that the change in over-all resistance of a wire-wound pot is not a steady unbroken variation (as found in carbon and composition pot) but is rather a series of jumps, the number depending on the number of turns used.

Thus we have discussed the most frequently used types of resistors from their most salient features; other facts necessarily enter into the picture, but space limitations prevent a more elaborate discussion. It should be mentioned, too, that resistors of many different characteristics have not been covered in this article mainly because these special versions have limited application in the amateur field. In general it is safe to state that the same considerations governing the choice of either composition or wire resistors can be applied to special resistances, since the three wattage equations mentioned previously are the governing laws of resistor design.

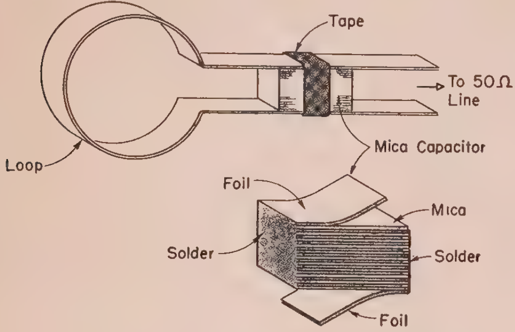
Inside the SHACK AND WORKSHO

Tuning Up Your Single Turn Loops

More and more amateurs are using low impedance "flat" lines between the final tank and the transmitting antenna. For correct matching, the coupling coil, or the link, should be tuned to the operating frequency. Since this is a parallel circuit, the necessary capacity to tune a single turn loop would be equal to

$$C = \frac{Q}{Z_0 \cdot 6.28 \cdot f} \quad \text{where: f is in cycles per second.}$$

Thus, if we assume a reasonable Q of 10 for the loop and an operating frequency of 14,100 kc feeding into a 50-ohm line, the necessary capacity would be approximately 2260 $\mu\mu$f.



I would suggest that the single-turn loop be constructed from a piece of copper ribbon rather than tubing. Bend it into the form shown in the accompanying diagram. Extend the legs of the loop to make a short "matching section" so that the total inductance may be varied. To obtain the correct capacity, build it up from fixed high voltage mica condensers, for example, Cornell-Dubilier Type 641-15A or Sangamo Type F1L, etc. Solder the appropriate terminals of this condenser pack together with a piece of copper foil to make connections to the loop legs. By sliding the condenser pack up and down between the legs, the length of loop, and hence the inductance, may be changed until a resonant point is found. This position is then fixed by wrapping the condenser pack and the loop legs with an insulating tape. Once this arrangement has been set up for the middle of the 20-meter band, it should only be necessary to tighten coupling at the extreme edges of the band.

Harold Bernhardt, OE-341 (ex-LY1HB)

Send contributions to Shack and Workshop Editor, CQ Magazine, 342 Madison Avenue, New York 17, N. Y. Payment will be made upon publication for all material used.

Antenna Switching on the 75A

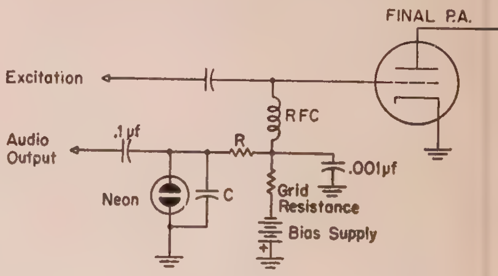
Generally, when a fellow works up to the inves ment of a Collins 75A, he also finds himself wi beams antennas for each band. That problem aro here and was solved when I found that the receiv uses a part of the bandswitch to turn the pilot ligh off-and-on with the band change. I tapped in this switch and brought out five wires to a ne terminal board at the back of the receiver. Usi 6-volt a.c. relays with d.p.d.t. action, I ground one side of the relay coil and then energized the in the proper sequence so that now when the pil lights change my input lines automatically chan over to the proper antenna.

Believe it or not, I got this idea from readi Scratchi!

—*B. E. Harris,* W7IYG.

Keying Monitor

The disadvantage of one of the recent relaxati keying monitors was that it would go along merril although the transmitter was going up in smok I believe a better method would be to connect t neon bulb in the grid circuit of the final amplifi so that unless the rig is perking itself the oscillat will not function. Secondly, this method would al have the advantage that should the excitation f off or rise unexpectedly, the increased voltage dr across the grid resistor will cause an abrupt chan in the frequency of the audio note.



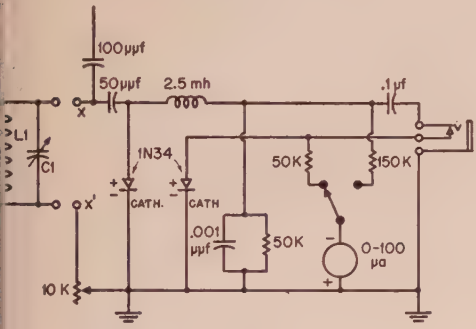
The diagram is relatively simple. The values R and C should be chosen to suit the taste of t operator. Note that the bias voltage should not high enough to start audio oscillations. But soon as the key is depressed the grid current flo and resultant voltage drop will fire the neon osci lator.

—*Lee L. Toman,* W3BIM.

Modulation Indicator and Field Strength Meter

This is a handy little gadget that is simple build and yet is very effective. While I have show a 0-100 microammeter, a larger meter will wor but will naturally lack the sensitivity. The who unit is easily built into a small metal box or cha sis. A regular four-prong socket is mounted on t k for the tuned circuit. The tuning condenser this shack is a litle APC padder (100 μμf) unted inside the coil form.

Vith the s.p.d.t. toggle switch thrown to the ht, the carrier level is indicated on the meter. is reading may be varied by adjusting the 10,000- n control. Once set, it will always remain the ne. Throwing the switch to the left brings the ter back to a zero setting, and then any modula- n will be shown as an upward reading. If hum noise is present on the carrier, it will also ister on the meter under no modulation condi- ns. An idea of the percentage of modulation y be obtained, since 100% is represented by the ter reading obtained with the switch thrown to right. Headphones plugged into the jack allow signal to be monitored.



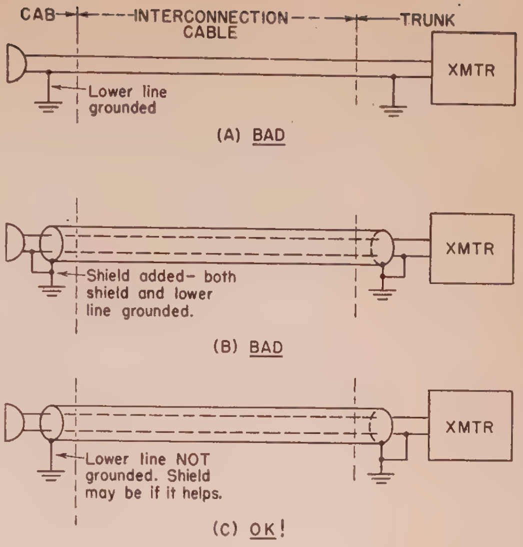
he modulation measurements are made with a ort" across the points marked "X." When this rt is removed and a tuned circuit substituted, gadget will read field strength (switch to the nt). The tuned circuits are typical and will be nd in any handbook. At 10 meters, for example, our-turn coil works FB with the 100-μμf APC.

—*H. L. McPeak,* W2SHT.

bile Mike Line Hash Cure

n running a long mike line for a mobile instal- on, many fellows who have never been through mill have considerable trouble with hash pickup. many cases the trouble is due to conditions strated in the accompanying diagram. Because usual installation uses a carbon mike, and ause the line is therefore of a low impedance, interconnection shown in part *A* is frequently d. If it works, then all OK, but this type of kup is very susceptible to hash pickup, especially he power supply is a vibrator pack.

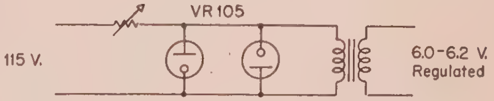
t this point the neophyte may add a shield to line, as shown in part *B*, although he is still a low impedance line shouldn't need a shield. results? Still HASH! Now the shield was bably a good idea, in fact it was probably quite essary, but the real source of trouble is still sent. Sooner or later, accidentally or on purpose, ham in question arrives at the connection shown art *C* (or alternatively goes off his rocker, *Ed.*). he difference between the diagrams is that the ld" mike line is *not* grounded at the microphone. shield may be grounded or not, whichever gives best results. The reason the cold line should


CAB
INTERCONNECTION CABLE
TRUNK
XMTR
Lower line grounded
(A) BAD
XMTR
Shield added– both shield and lower line grounded.
(B) BAD
XMTR
Lower line NOT grounded. Shield may be if it helps.
(C) OK!

be left ungrounded is that hash pickup is due to circulating currents in the chassis of the automobile. If a portion of these currents pass through the lower mike line, as it most likely will if both ends are tied to ground (literally speaking, the line is parallel to ground!), the corresponding voltage drop appears as a hash signal at the transmitter mike input.

—*Richard H. Houston,* W3MAX.

Regulated Oscillator Filament Supply



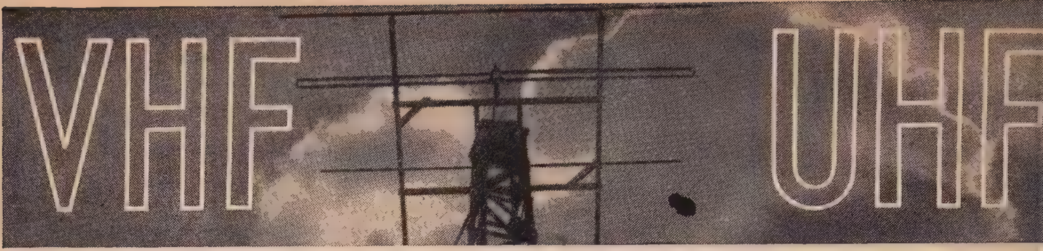
This idea may be useful in regulating the filament supply voltage for units similar to the Collins 70E8 PTO which seems subject to changes in the filament voltage. It can only be used for one low drain tube due to the current limitation of the VR105. However, for those who want the ultimate in stability, this circuit is extremely useful.

—*Mary Gonsior,* W6VFR.

Back-wave Getting You?

If you're using one of the many really stable oscillators which have the shortcoming of not keying very well, don't neglect the possibility of attaining full breakin by the use of a carefully shielded transmission line on your receiving antenna. With the use of balanced coax and well-shielded "antenna" posts it's relatively easy to keep the oscillator signal down.

—*W2BYF*



Conducted by E. M. BROWN, W2PAU*

THE CLOSING months of 1949 brought rich rewards to the faithful six-meter operators who had remained at their posts in hopes that maybe the long-term predictions were in error, and the old band still had a few tricks up its sleeves. As if in answer to their prayers, the ionosphere staged a display that had hardly been equalled even at the peak of the sunspot cycle. All types of ionosphere propagation have been reported during the past month, F-layer skip, sporadic E, rebound, and a few examples which point to meteor-trial reflections and F-layer rebound have been noted. The surprising thing about the whole affair is the remarkable consistency with which the ionosphere has been building up and supporting VHF transmissions at a time when conditions were scheduled to get worse than in previous years. These openings have not been confined to any particular geographical area, but have blanketed the entire hemisphere in which six-meter activity is carried on. In fact, on the basis of a few "heard" reports from the European theatre, it would appear that the unusual conditions existed all the way around, and it was merely lack of six-meter amateur activity in the Old World that prevented many more international QSOs from being made. The sunspot numbers seem to be climbing slightly, which is definitely a reverse of the trend that might be predicted on the basis of our knowledge of sunspot cycles of the past. Whether this will prove to be a mere hump on the generally downward slope of a curve, or whether the average of the sunspot numbers is actually trending upward on a long slope remains to be seen. Conditions at this time have the experts guessing. To quote Perry Ferrell, "something mighty funny is going on!"

Space does not permit a complete description of each of the recent band openings. Literally hundreds of DX QSOs have been made during the past month, and it seems likely that the total mileage covered may actually set a new record for six-meter activity. In a later section of this column we will attempt to present a summary of the band openings, breaking down the reports at hand to show when good conditions prevailed, and approximately who worked who!

While all this was going on at six meters, the two-meter band seemed strangely placid by contrast. Although conditions were frequently better than normal, the eager aggressiveness to be there punching whenever the band seemed a litt open was lacking in most of the occupants of t band. The winter change-over is about comple here on the eastern seaboard. The rag-chewer the network operators, and the round-table c ganizers have come into their own, and can car on in the style of operating they like best witho the fear of interferring with someone's pursuit DX. As the number of miles per contact go down, with the onset of relatively stable conc tions, the number of minutes per QSO seems go up in about direct proportion! As a result, son fine opportunities to investigate propagation of D signals are missed. Some of the amateurs who a located in the outlying sections of our centers population are finding it hard to get enough co tacts to make the game worthwhile. In our la column we lauded the spirit and the aims of t fellows who are trying to maintain a semblance activity through the winter through network c ganizations, but we feel now that a note of cauti should be added. It seems to us that unless son program of station improvement is incorporated one of the basic aims of such organizations, the is a grave danger that the steady trend of progre which we have shown to date on our 144-mc ba may level off. The incentive to further experime tation may be stifled by the complacency of ba occupants who are content to do the same wo night after night. We still have a great deal learn about our two-meter band, and it seems us that we have barely scratched the surface achievement. If we all do a bit more work to i prove our VHF equipment and operating tec niques, new vistas of operating pleasure will op for us.

As for the higher-frequency assignments, t same old story seems to apply. As 1949 draws a close, the great plans which some of the bo had made for the exploitation of the 220 or 4 mc bands seem to be no closer to culmination th they were at the beginning of the year. The f pioneers who had the stick-to-it-iveness to bu equipment for these frequencies seem unanimo in their pleas for new activity. The problem finding stations to work seems to be more insu mountable than getting your own station toget to work them.

New Year's Resolutions

First and foremost among our resolutions e coming year should be one that applies to every am, VHF-minded or otherwise. We should all an to get on the air more often during the com- g year. Ye Ed is not sure whether the general duction of activity which we have noted on the nds above ten meters is typical of the rest of the nds, or whether the rather local aspect of the HF bands has distorted our perspective. We are re, however, that in the areas around the large ties which we have visited, ham radio as a hobby s suffered a great loss in popularity as compared its position a few years ago. Whether, as some thorities would have us believe, the ranks of ham dio are becoming overloaded with "tired old en," whether the great strides of progress made the commercial and military interests have left e "attic genius" so far behind that he has lost e incentive to experiment, or whether we have en lax in lending a helping hand to the new- mers who might provide new blood for our nks has not been made clear. In our section of e country, TVI has played a great part in de- talizing our hobby. Since in many cases the solu- n to this problem lies beyond the ham's respon- bility, he should look for new ways to indulge s urge to participate in ham radio. It would ap- ar that the use of low power on the VHF bands fers one of the most promising solutions to the oblem of TVI. If we can get some of those boys ho used to populate the various bands with local g-chews during the evening just to give a try the VHF bands, they will be pleasantly surprised learn that they can cover a reasonably wide ea with good signals, and they will not have to orry (for a while yet) about where their har- onics are falling. And the VHF bands will gain me much-needed activity.

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*Associate Editor, CQ, Send contributions to E. M. Brown, 88 Emerald Ave., Westmont, N. J.

The responsibility for exploiting the bands above 48 megacycles seems to rest mainly on the shoul- rs of the boys now populating our two lowest HF bands. There does not seem to be any great igration of the DX men, traffic operators, low- equency rag-chewers, etc., to the UHF bands. seems to us that the very same individuals who oneered the opening of the five-meter band, the d two- and one-half-meter band, and lately the o-meter band, will of necessity be the ones to ide others to the higher bands. We hear an- ished cries from the stalwart six- and two-meter erators to the effect that if we take the real old- mers off these bands and move them up to the wer frontiers, there will be too few hams left maintain activity on the already-established bands. On the other hand, if the old-timers spend all their time maintaining activity on the lower bands, who is going to open the higher ones? From our point of view, there have always been two classes of hams, the experimenters and the operators. We should by now have developed a corps of operators able and willing to hold down the claims which the experimenting and pioneering amateurs have staked out on the lower bands. So, in summary, if your interests lie in chewing the rag on one of the VHF bands, or in watching that band continuously to learn all that can be learned about the propagation of signals in that frequency region (both very worthy objectives), by all means resolve to do so, and convert as many new-comers to your phase of the hobby as you can. But if your interests lie in the experimental aspects of the game, and if you are happier talking on a new band to someone a few blocks away who could copy you Q5 if you'd only open the window, then your resolution should be to let nothing deter you from trying those new bands. Freeze the design of the two-meter and six-meter gear where it is today (if you are a true pioneer it is probably ahead of the state of the art anyway!), dust off those doorknob tubes and klystrons, and heat up the old soldering iron. Publicize your efforts, try to round up the same gang you used to work in the early days of the two-meter band (before surplus) and head up for the higher frequencies. Who knows, you might actually discover something. And those new Technician class licensees are going to need some real old ham-style advice!

On the other hand, if you are presently active on one of the VHF bands, satisfied to roost there for a while, to chat with the gang when they are on, to get in on all the band openings, and in general just see what can be done on that particular band, one of your first resolutions should be to conduct a complete check-up on your station and prepare it for the coming season. Isn't it a fact that the major part of your gear has been running along for quite a while without an overhaul? And haven't you been promising yourself to try a real quiet preamplifier ahead of the ol' faithful receiver? How about the antenna—wouldn't it be wise to beat the winds to the act, take it down, and maybe put up something a bit more elaborate? Remember, if you double the size of the antenna, you stand to pick up about 3 db of signal improvement. And this time, when you get the antenna built, don't rush the job. Take time to tune it up and match it to the feedline before the big erection! That feedline is probably getting kind of old and cracked after all these months of exposure to the elements; how about replacing it with the lowest-loss type of line that you can afford? Check into the loss figures of the popular types of co-axial and twin-line types of feeders before jumping to a conclusion. Maybe you'll figure the same as we did that the old reliable open-wire line has much to recommend it. And, while you're at it, why not look into the problem of providing a better

(Continued on page 87)

BACK SCATTER

We wish to take this opportunity to apologize to the six-meter operators who so kindly sent in reports of activity during the month of October. Somewhere between the mail box and the type-setter's shop three pages of six-meter notes were lost, strayed, or stolen from the body of the December CQ column. We have attempted to make up for this omission in the January column, and we'll try not to let it happen again.

The Monitoring Post

gleaned by THE BRASSPOUNDER*

> Here's some inside information on the guy at the other end of the QSO. The Brasspounder's notebook is extensive, but he'd welcome contributions from all active hams so we can all get to know each other better. Keep him posted on the latest gossip, and he'll dish it out to us on this page each month.

URGENT TRAFFIC MOVES QUICKLY when the need arises. **W0WIQ,** Western Union op at Napoleon, N. D., could do nothing to hurry WU traffic upon which a funeral depended, because a sleet storm disrupted wire traffic, so a call was put thru on 14 mc to **K9FAA—W9VSO** was handling **K9FAA** at the time and telephoned **W9ONY,** WU wire chief at Milwaukee, who found the messages, gave them to VSO, who in turn transmitted them to Napoleon—only one-half hour was needed to clear up the business. W9VSO and ONY proved their alertness in this semi-emergency situation with W0WIQ . . . **W1EMG** tells a story of the traffic op who makes recordings of messages because he has to play and replay them to make sense of the poor fists in the original transmissions . . . **VE7YI** is the NCS on 3655 kc at 10 P.M. daily for the net taking all traffic for British Columbia . . . They tell us that **W9JTX** has a brand new hubby . . . A pair of 8011 tubes will replace the single 814 final of **W9EAM,** chief announcer at WGIL when he's working—Bunk is heard on 7 mc in the early morning and also is NCS of the Knox County, Ill., net on 3657 kc . . . A good evening's DX was turned in by **W0JVR** when his QSOs listed six VKs, two JA2s, one ZL, a G, and one CK, all on 7 mc—his 8 watts to a 6L6 on 28900 kc phone demands an explanation from the Eas Coast contacts he makes, they being skeptica that the "Jungle Voice of the Rockies" use such low power . . . While many accept deliver of traffic as a matter of due course, or as thei right as residents of the good old U.S.A., on mother shed tears of joy when a message wa delivered from her son at college 1,000 mile away, in Okla.—these manifestations are wha make traffic handling worthwhile to the gang

The "Sprague," a museum piece and the larges of the Mississippi River paddle wheelers, serve as a meeting place for the Vicksburg Amateu Radio Club—**W5MMZ** is the club prexy and als in charge of a CAA station in Mississippi . . Formerly W8DMW and W1PFD, Lyman Blos som is now on 75 and 20 phone and 80 c.w. a **W2CMT** at Schenectady, N. Y. . . . Traffic fo eastern Canada can be placed on 3675 kc at 7:4 and 9:15 P.M. Monday thru Friday with **VE2 GM** as net control . . . **W3AGB** tells us of th Harrisburg (Pa.) Amateur Radio Club holdin their "Gadget Night" in which the owner of th most popular and practical gadget wins a priz . . . Ed, **W3NIH,** erroneously called "Tillie" be cause of Tillie's similar call, **W3NHI,** has diff culty establishing his sex with some of the eage boys during QSOs—Tillie's OM is also Ed— Tillie with a couple of Eddies thrown in.

It is extremely pleasureable to sit back an copy **W7RT** at a comfortable 25 or 30 w.p.m while he sends his contact a great deal of inte esting chatter—among some of RT's gear on han are a 20-watt nbfm rig on 10, 20, 40, and 80, bea antennae on a couple of bands, a beam made two dipoles (reversible fixed beam on 7 mc plus a folded dipole on 7; three converted SCR 522 transmitters on 2, 5, and 10 with a 17-tu receiver for 144 only; two Command receive one each for 3.5 and 7 mc, and two Comman Xmitters for 7 and 14 mc, these for emergen use; a 3.5 mc receiver operates from 6-volt ba tery or AC or hand-cranked generator; mobi rigs on 10 and 75 phone in the Dodge; th Plymouth sedan type truck pulls a small trail loaded with tent and camping gear as well as 500-watt gas-driven power plant used at tim while driving, though field day operation is i main object; W7RT copped the certificate f hand-copy code speed contest at 45 w.p.m. r cently, and took the Los Angeles conventi hand-written copy contest at 40 w.p.m. last yea more than 100 countries worked includes 2 VKs, 100 ZLs, 100 Gs, 50 ZSs, and worked a continents on 10 and 20; latest DX is U6A UP2KCB, UN1AB, FM8AD, YS1ZG, EA8T and VP9IS . . . **W2BSH** has licked his T

Two of the reasons why W2UMB gets out so well.

Address correspondence to: The Brasspounder, % CQ Magazine, 342 Madison Ave., N.Y. 17, N.Y.

problems with some home-made choke coils in the final . . . Take your hat off to "Vi," **VE3DEX**, XYL of **VE3BKX**, who built her own rig —the OM missed a few parts from his gear, but DEX has been heard in New Zealand.

WØKVD not only made the front page of a ocal paper, but filled three columns a few months ago with his efforts to contact a GI near Tokyo for the purpose of conducting a wedding ceremony by ham radio. A misunderstanding between the couple involved, Johnny and Dot, resulted in divorce last spring; the Army soon after notified Dot of Johnny being stricken with meningitis, whereupon Dot remorsefully realized the error of the divorce. QSO with several JA2 stations did not locate Johnny until **JA2AD**, in contact with KVD, said his QTH was but a few yards from the hospital where Johnny was. Arrangements completed for the ceremony, a group of Dot's friends at WØKVD, a larger group of Army personnel at A2AD, with Army chaplains at both ends of the QSO, and Johnny and Dot both said "I do" or the second time. Three-year-old Bonnie, daughter of Johnny and Dot, talked with "Daddy" for the first time over WØKVD, not having seen him for two years. Johnny and Dot re together again now and have picked up where they left off when Johnny went away, with the memory of WØKVD and JA2AD being the most important means of communication in the world.

Milwaukee Radio Amateur Club packs the ouse with 200 attendance at their meetings . . . The Poet, **W2ANG**, hands out advice on marital relations by the yard, to either the XYLs or OMs . . . The NYS (N.Y. State) traffic net on 720 kc has a busy time conducting three sessions ach night at 7, 8:30, and 10 P.M. . . . **WØCKJ** is making his own transformers, chokes, and tuning condensers for the new rig that will soon e perking . . . With the advent of summer, QRN the VKs, ZLs, etc., spend most of their time working one another, abandoning DX contacts for the most part . . . "Copied you solid, FB," reported two ops within an hour—after a direct and pertinent question was completely ignored by them . . . The Milwaukee School of Engineering Amateur Radio Club, **W9IWT**, pres.; **W9FSU**, v-p., and **W9FTW**, treas., and organized by **W9JWT**, has **W9HHX** as its call with a pair of 833As in the final, working 10, 20, 40, 80 cw and phone; exercises dedicating the station during 1949 Homecoming Week heard **W4ALJ** as principal speaker; W9HHX will major in traffic, tying into the Wisconsin Net on 3775 kc, to accommodate the 1,500 school students from all over the world . . . When **W2UZX** suggested that perhaps eavesdroppers were listening to his QSO with YL **W2RTZ** at 4 A.M., they decided they were very much alone, whereupon four other unidentified stations broke in on the frequency with "hi" . . . **W7LCM**, Mayor of Huntley, Mont., is heard at times calling "CQ Dog Catchers." **W2PSH**, being curious, answered LCM's call, and an introductory one-hour QSO on 10 resulted in PSH and his XYL being entertained by the Mayor reading cowboy ballads; after several QSOs, LCM told PSH a letter from the latter's Mayor stating his qualifications as to "sanity, character, and ability to catch dogs" would bring an official appointment to W2PSH as dog catcher of Huntley, Mont.; the required letter to Mayor W7LCM stated in part: ". . . we vouch for the sanity of W2PSH, but it is open to question by his continued and frequent use of ham radio. All dogs in the neighborhood are attracted by W2PSH because of a serum he developed and sprays on his pants legs." Mayor W7LCM, an invalid for the past twelve years, must lie constantly on his stomach, but even this has not deterred him from appointing hams in Chicago, Miami, Philadelphia, Los Angeles, and other points in the U.S.A. as official dog catchers, all displaying certificates signed by the Mayor to attest to their titles.

SELENIUM RECTIFIERS

(from page 33)

rolytic capacitors. The first is to employ a cathode hat is greater than the anode in surface area. This s usually accomplished by etching the cathode. This ives better stability than plain foil electrolytics nd results in only a slight increase in physical ize and cost.

The second method is initially to form the cathode late with a dielectric film to a potential equal to r greater than the maximum peak potential of the uperimposed alternating current component which ill actually be encountered. This requires an increased area of both anode and cathode surfaces o the extent that the relationship

$$\frac{C_1+C_2}{C_1C_2} = C.$$

This will entail a considerable increase in physical size and cost, but gives absolute stability of the initial capacitance.

In an attempt to prove this theory, I obtained two sample capacitors. One had an etched anode and cathode, while the other had an etched anode and a *plain* cathode. The two capacitors were placed in the circuit shown in *Fig.* 1. After 500 hours of continuous operation and a 100-milliampere load, the capacitors were removed and their capacitance measured. The capacitance of the etched cathode capacitor remained constant while the plain cathode capacitor decreased by forty per cent in capacitance. A second test was made, and the etched cathode capacitor remained constant, while the plain cathode capacitor decreased by twenty per cent. While the decrease in capacitance will vary considerably between capacitors, this test indicated that a plain cathode capacitor should not be used in circuits where a high ripple current is present.

MOBILE CORNER

Conducted by **RALPH V. ANDERSON, W3NL***

REPORTS AND CONTRIBUTIONS have been received from every section of the U.S. and from several foreign countries. A study of these reports indicates that most activity is on 75 and 10 phone, although there are numerous letters from the 2, 6, and 20 fellows. Ten seems to be the most popular band for group organizations for emergency service, although 75 is not without group activity. An interesting fact is that, if these reports are representative, the midwest generally is using 50 watts or more, the east coast 20 to 25 watts, and the west coast about even between low and high power.

Calling Frequency

A great many have asked for the establishment of a mobile "calling frequency." The Washington Mobile Radio Club experimentally used an automatic calling device which worked satisfactorily enough for universal use. In many cases mobile clubs have receivers in police stations operating on their calling frequencies. A standard frequency would permit an operator to raise someone in a hurry in an emergency. For mobile radio to operate effectively, it appears a standard calling frequency is desirable. The Akron club and the Washington club are using 29.520; Chicago is using 29.640. Many individuals have suggested frequencies about 29.1. Let's have your suggestions—a standard frequency will be proposed in the next column. No suggestions have yet been received for a calling frequency on other bands.

Installation Hints

For the 75 meter whip, many have found it more efficient and easier to connect to ground the low end of the loading coil to the car and connect the coax to a tap on the coil. W1IGW uses 125 turns 1 inch in diameter and taps on at the 13th turn for a 7 ft. whip . . . With multiband operation, traps in the generator lead are not universally effective. The best method for generator hash suppression seems to be shielding the "field" and "hot" leads from generator to regulator, grounding the shields at both ends and keeping the leads as short as possible. Capacitators may be used on the hot lead, but do not use them on the field lead. W4FDF says this worked FB on 5 cars . . . Of great value is a 60 ma pilot bulb connected to absorb some soup from the antenna and mounted where it can be seen from the driving position. It shows when something has gone haywire in either the xmtr or modulator . . . A b.f.o. is of considerable value. One will be available commercially in the very near future . . . Very few new installations are made in the trunk, and many of the older ones are being moved up front. The modern trend is to make the transmitter controls as available as the receiver controls . . . Practically all dynamotors (and extra batteries if used) are mounted in the engine compartment where only a short lead of heavy wire is required . . . Chest mikes are being used a great deal; some have the mike attached to the sun-visor; the emphasis being on freeing both hands to drive. It's possible that mobile radio might be blamed for the cause of an accident because the driver did not have both hands free.

DX Note

Want to work New Zealand? W6FRS reports that ZL2CY at Nelson calls "CQ mobile" every Saturday 1800-1900 PST on 28.420 using 100 w to a 15 element beam. Many have suggested that the high power boys and the foreigners call "CQ mobile" once in awhile to give their low power a chance.

Awards

The Disaster Group of the Honolulu Amateur Radio Club has a certificate for any station working five HARC mobiles. Address KH6AN. The Maritime Amateur Radio Club if offering a certificate for working 30 MMs beyond ground wave distance. Address W3NL . . . Bil Harrison's WAS contest is still open. Congrats to W0NFA for winning Bil's WAC award.

More DX

On 75 phone W7KUT in Oregon worked W5KUT in Vicksburg, Miss., and W6EDG, Sonoma worked KL7TZ, Middleton Island. W3OQI, W6MBA, and W0NFA have WAC mobile. On 10 phone W3CDL has worked 36 states, W4PH has worked 20 countries. Anyone any better?

Scatterings

The Akron mobile group recently provided communication between the home of a 9-year old gir ill with polio and the picnic grounds where she had planned to attend a picnic. Those attending the picnic passed on their good wishes, etc. Participants were W8AXT, W8DNZ, W8YGQ, W8KND, W8BFH, W8CMC . . . The Akron group also had a Mobile Caravan to the National Air Races . . . W6EDG works 40- and 80- meter c.w. mobile . . . The Kansas City mobile boys furnished communication in a major gas line break when the regular phon system was overtaxed. They also do patrol duty o the Missouri river during flood threats . . . W2YLS

Send contributions to R. V. Anderson, 2818 Que St., S. E., Washington 20, D. C.

on 75 mobile, accepted a message from W1GIX, with W2BTG's help. It happened to be for the next town on the road. He delivered it by telephone . . . The Oak Ridge, Tenn., boys (2 meters) made a trip to Smoky Mountains and two trips to Frozen Head Mountain this year.

Maritime Mobiles

The Maritime Mobile Amateur Radio Club has been formed with acting officers: W6YYT, Commodore; W5AXI, Vice-Commodore; and W3NL, Secretary-Treasurer. The proposed Constitution and By-Laws have been sent to each known MM. Those MMs not already having done so, send in your call, ship, mailing address, and run to W3NL. Initiation and first year dues are five bucks for active members. "Official" stations are W3ICW, W5KTL, and W6HK. A message for the Secretary-Treasurer to any of these will be promptly delivered. Other stations very active with MMs and offering "telephone facilities" are W1CMP, W2MEG, W3JLE, W3DWR, W3OB, W4KPQ, W5VY, W5QJ, W5NBK, W5HR, W6LYG. This list is not all-inclusive. Any hams willing to QSP MMs send in your call.

W8DQO submits a list of 55 MMs worked. W1AVY submits additional stations to bring his total to 46.

SMALL RIG

(from page 14)

lowed closely. Clipping is adjusted by a 2000-ohm potentiometer in the grid of the second section of the 6SL7. This presents an extremely low load, and considerable gain is lost here. At the time of construction, it was felt that three stages of amplification might prove insufficient, so the stages were designed for maximum gain. However, in operation, the deviation control is just barely opened for the desired swing on ten.

The three 125-mh chokes are mounted in separate shields on the rear of the chassis. These inductances must be well shielded from each other. The condensers comprising the filter were mounted on tie points adjacent to the chokes. The 2000-ohm potentiometer was mounted to one side of the filter with its shaft protruding to the rear. Inasmuch as it need be adjusted but once, this is the ideal place for it. The knob is sheltered by the cabinet so its position can not be changed inadvertently. The 6SG7 is a reactance modulator, and, since it is tied to the plate of the 80-meter buffer, only the phase of the signal is changed. The plate and screen voltage of the 6SG7 are regulated by the VR tubes, since any change in voltage would mean a change in phase and consequent modulation. Across the grid of the second speech amplifier is a 10-h choke, the current rating of which is of no importance. The purpose of this is to restrict frequencies below 500 cycles. With the clipper-filter, the effective range of audio passed is between 500 and 3000 cycles.

Tuning the transmiter is a swift and simple process. Frequency is selected by the VFO or one of the nine crystals. The bandswitch is placed on 3.5 mc, and low power is applied. The slug in the 3.5 mc buffer is adjusted for maximum deflection of the grid meter. The grid tank is then tuned to resonance and the excitation control adjusted for a 6 ma reading. Final plate voltage may be applied and that stage resonated. Coupling is adjusted for a 200 ma reading on the plate meter. For operation on any other band, the bandswitch is set in the appropriate position and the slugs tuned for greatest swing, much as you would align a superhet. It is not even necessary to change the bandswitch from coil to coil. For example, when operating on 14 mc, the band switch is set on that band, and the 14-, 7-, and 3.5-mc coils adjusted for greatest grid current indication.

For voice operation, the deviation control is opened about one quarter turn and the clipper potentiometer set about half way. The emission switch is placed on the NBPM position and the microphone is connected. Adjustments may be made by using low power and a nearby receiver. With someone reading into the microphone, adjust the clipping until the speech comes through most clearly. Adjust deviation to the point where the speech is extremely clear, but not swinging over the authorized bandwidth. This is not at all difficult. The clipping prevents you from swinging too far, and should you get the deviation control advanced too much, the mushiness of the speech will immediately warn you. If working an amateur without an NBFM adapter, you might have him cut his A.V.C. and place his crystal filter in the sharpest position. Selectivity is paramount for NBPM reception without an NBFM adapter.

Reports from other amateurs are gratifying, to say the least. Particularly enjoyable are the remarks about the clean, easily read signal. The VFO is indistinguishable from crystal, so, as you might expect, crystals haven't been an expense around here for some time. The 579Xs and 589Xs from Denmark, Finland, England Czechoslovakia, Belgium, and France are an excellent indication of signal quality.

Shellac-backed decalcomanias provided the commercial touch.

OOPS . . . SORRY!

In the article "The Two-Meter R9'er" last month, we accidentally omitted the coil table for the low-frequency model. Here it is:

COIL TABLE

Band	L_1—L_2	R_1—R_5 (ohms)
6	8 T #26 enam. wire	7000
10	16 T #26 enam. wire	7000
20	25 T #30 enam. wire	see text

DX AND OVERSEAS NEWS

Conducted by HERB BECKER, W6QD*

HERE WE GO again . . . . Judging from the number of logs pouring in from the second *CQ* World-Wide DX Contest, I would say that one dickens of a lot of interest was cooked up. Here's a quick digest of what a lot of the stations did, but bear in mind that all these figures are definitely unofficial.

These last minute scores from the second *CQ* World-Wide DX Contest, as you can see, do not present a complete picture, but I thought you would be interested in a few which were rounded up for this issue. At this point, it is impossible to tell you which of these stations were single- or multiple-operator stations; likewise, many of those whose scores are shown went out for single band scores, while others worked all bands.

C.W.

W1BIH	125,000	W8JIN	306,000
W4KFC	310,000	W9DUY	205,000
W4OM	31,800	W8ZY	180,000
W4TO	100,000	W9ANT	150,00
W5LVD	107,600	W9VW	78,000
W5JC	50,000	W9LM	161,800
W5FNA	41,000	VE4RO	179,800
W6SZY	290,000	VP1AA	902
W6OEG	225,000	VE7EH	8,352
W6GRL	198,500	MI3AB	66,240
W6RM	175,000	JA2BQ	55,071
W6QD	130,000	VE8AS	5,472
W6IBD	116,600	VO6EP	28,500
W6BPD	110,000	ST2TC	8,300
W6EPZ	95,000	DL1FF	200,000
W6OMC	93,800	CE3AG	249,480
W6GAL	89,000	ZL1MB	304,419
W6WB	72,000	KZ5WZ	18,000
W6PQT	71,000	GW3ZV	225,000
W6CTL	68,500	KG6DI	281,700
W6TZD	63,000	MP4BAD	52,500
W6MVQ	59,000	AP5B	15,183

PHONE

W1ONK	18,800	W6AM	20,300
W1MRP	2,500	W8ZMC	21,900
W3LOE	47,056	W8VLK	8,745
W4OM	22,500	VE4RO	19,600
W4HA	3,200	M13SC	25,800
W6SA	60,000	OK1MB	14,100
W6GRL	51,100	YN4CB	900
W6RM	45,000	TI2HP	34,000
W6DI	23,000	XE1AC	17,400

Take a look at ZL1MB with 304,000 points: he had 752 contacts. Then there is W4KFC with 310,000, and W6SZY (2 ops) with around 290,000 with 475 QSOs. W6OEG and W6ENV worked together and made around 365 contacts with a score of roughly 225,000. While still out on the West Coast, I might as well tell you that W6GRL with one op scored 198,000 and had 354 QSOs. Next in this single operator group, it looks like we have W6RM with 175,000 and 329 QSOs.

W6GAL, with his pal W6GHU, gave 20 meters the dickens, making 280 contacts and 34 zones and 81 countries. His single band score of 89,000 looks good. However, the single op, single band station that really went to town was W6PQT with 71,000, 35 zones and 75 countries . . . QSOs were about 250, and we should add, "Plus 2 hours sleep!" . . . .

(QSY to page 46)

WAZ HONOR ROLL

To enter the Honor Roll, fill out one of the Zone and Country List forms which we will supply on request. Please send a stamped, self-addressed envelope.

The Honor Roll contains totals of postwar contacts only, that is, contacts made since November 15, 1945.

It is not necessary to submit confirmations until you are eligible for a WAZ certificate. To be awarded a WAZ certificate, send confirmations for the 40 zones, as well as a list of them, direct to the DX Editor. If a Country List has not been previously submitted, then one must accompany the WAZ certificate application. For these lists, please use one of our standard Zone and Country List forms, and it will then become our permanent record.

The Honor Roll is in two divisions; the c.w.-phone section, which gives the current total of zones and countries any station has worked while using c.w. or phone, or both; the other section contains a list of "phone only" stations. All contacts claimed in this section must be on a "phone-to-phone" basis.

All-time WAZ certificates will be issued upon presentation of proper confirmations. The Certificate will be similar to the postwar certificate, although no listings of all-time WAZ certificate holders is anticipated at this time.

**Send all contributions to Herb Becker, 1406 South Grand Ave., Los Angeles 15, Calif.*

W. A. Z. HONOR ROLL

CW & PHONE

WAZ

W6VFR	229
W2BXA	225
W6EBG	225
W3BES	224
W6ENV	224
W6GRL	223
W6MEK	221
W3GHD	221
W6ADP	220
W8BHW	218
W3LOE	217
G2PL	216
W6PFD	216
W6SN	214
W6ITA	214
G6ZO	214
VK3BZ	211
W6SAI	210
W0YXO	210
W6FSJ	208
W2AQW	208
W8HGW	208
W6MX	206
VE7ZM	206
W4BPD	206
W6DI	204
W6MJB	204
W6TT	204
W9VW	204
W4CYU	203
W3EVW	203
W6RM	202
W7GUI	202
W6SC	202
W6OMC	202
W7AMX	201
W6DZZ	200
W6MVQ	200
W6OEG	200
W6SYG	200
W9KOK	200
W6PKO	199
ZL1HY	199
W2IOP	197
ZL2GX	197
PY1AJ	196
W6WB	196
W6AM	195
LU6DJX	195
W6NNV	195
VE7HC	195
W6GAL	193
W6AVM	192
VE4RO	191
W6ZCY	191
W5KC	191
ZS2X	191
VK2DI	191
W6HX	190
W6RW	190
VK3JE	189
W6RBQ	188
W0NTA	188
W6PQT	187
W6AMA	186
W2CZO	185
W6PB	185
CE3AG	184
W6SA	184
W6UCX	184
W6AOA	181
W6KRI	181
W6SRU	181
VK2ACX	180
W6DLY	179
W6EFM	177
W7DL	177
W0UOX	177
W6TI	176
CX1FY	176
W6IBD	176
W1AB	175
G3DO	175
W6WKU	174
W6CIS	174
W6TS	174
W7FZA	174
W6PCS	174
W6TZD	173
W6UZX	173
G5YV	172
OK1LM	172
W6SRF	171
LA7Y	171
W6BAM	170
W6PZ	169
W8SDR	169
VK4HR	169
KH6BA	169
W5AFX	169
ON4JW	169
W6JZP	168
W6RLN	168
W6ANN	167
W6GDJ	167
W6UHA	167
VK3CN	167
W6EPZ	166
W6DUC	166
KH6MI	166
W6EAK	163
W6YZU	163
W6KUT	161
KH6IJ	161
W6PUY	160
W6BVM	159
W6CYI	157
W7BD	157
W7BE	156
W6BAX	155
G3AAM	154
I1IR	153
W6KEV	153
OK1HI	153
W6LN	153
W6BPD	152
W0OUH	152
VK2QL	151
W6LRU	150
W6LEE	150
W6FHE	150
W6PH	150
OK1FF	148
W7DXZ	146
W6AYZ	146
W9NRB	145
W6MUC	145
W6QD	145
W6WWQ	145
W6LER	145
ON4TA	144
W6LDD	144
OKICX	144
JA2KG	143
W6CEM	136
G3AZ	133
W6TEU	133
W6RDR	133
W6RLQ	132
W6MHB	130
W7GBW	127
G8IP	127
G5BJ	126
W6BIL	119
PK6HA	124
W6NRQ	123
W6MLY	123
W7KWA	98

39 Zones

W0NUC	211
W2PEO	211
W3KT	210
W3IYE	209
W9ANT	209
W2HHF	208
W3JTC	208
W2NSZ	205
W8NBK	203
W1JYH	202
W1BIH	201
W9RBI	201
W4AIT	201
W9IU	201
W1ENE	200
W2HZY	200
F8BS	198
G4CP	195
W2GWE	195
PY1DH	194
W5ASG	194
W3JNN	191
W3EPV	191
W3DPA	191
W2AGO	191
W1AWX	191
W2CWE	190
W4GG	185
W8RDZ	184
W3DRD	183
W41 NL	183
W3OCU	181
VO6EP	179
W3DKT	177
W1ZL	176
W6IFW	174
I1KN	173
W0DU	173
W3JKO	171
W2WZ	171
W0SQO	171
W9LNM	170
W2EMW	170
W1NMP	169
W8SYC	169
W2CYS	167
OK1VW	167
KH6MI	166
W8LEC	166
W2CNT	166
W4DKA	165
W9MXX	164
W0EYR	164
W9VND	164
W6CTL	164
W3KDP	162
W4BRB	162
G5DQ	160
W9LM	159
W0GKS	158
W4OM	158
W0AIW	157
I1AY	157
G8KP	156
W9YNB	155
G6QR	152
W2RDK	152
W4VE	152
G2AJ	151
W9FKC	150
SM5WI	148
DL2KW	147
G2WW	147
W6EHV	147
W2COK	146
W2GUR	146
W2MEL	145
W6BUD	145
W2BJ	145
W7PGS	144
W8VLK	143
W6BXE	142
W9DUY	140
G6BQ	140
G3FJ	139
W6ID	139
OK1AW	138
W6LGD	136
W8WWU	136
W9TQL	135
W6BZ[illegible]	134
KH6PY	134
OKICX	133
G2BD	132
G5RV	132
W7ETK	132
VK4RC	131
G2FSR	130
W5CPI	130
KH6VP	129
VR5PL	124
G5VU	124
W6MI	124
W6ATO	124
G3AAK	122
GM3CSM	121
G8RL	120
G5WM	120
W7BTH	120
W6NTR	119
W6MUF	118
DL3DU	118
G6BS	117
W6NRZ	117
DL1DA	117
W7HXG	115
G3QD	116
G3TK	114
W6JWL	114
W7ASG	110
W7GXA	105
KG6AL	104
W6LEV	103
W7ENW	101
W6WJX	101
W6EYC	91
W7LEE	91

38 Zones

VE3QD	190
W2PUD	180
CM2SW	174
KP4KD	172
W8CVU	171
W8KPL	166
W3IYE	161
W8FJN	160
W3LVJ	145
W2WZ	138
TF3EA	137
W9FKH	135
OE1CD	133
W4FPK	131
G8IL	131
G5CI	130
W2PQJ	130
W3ZN	129
G6LX	126
W9MZP	126
GW3AX	123
W9TB	122
GW4CX	120
W7EYS	107
W6VAT	107
KL7PJ	107
G3ZI	107
C1CH	84

37 Zones

W2HMJ	178
W1KFV	168
W2ZA	160
W4LVV	157
W2RGV	150
W4IWO	146
W3WU	146
W8EYE	142
W4ML	137
GM2UU	133
W2AYJ	133
W9ABA	132
W9TQL	129
W0AZT	129
W4DIA	129
VE3ACS	128
W3FYS	124
ZS2AT	124
VE1EA	116
W0FET	115
W6AX	110
G4AR	108
W8HSW	104
W7PK	104
G5MR	100
W2BLS	99
G3AAE	99
W2SGK	95
KL7KV	88

36 Zones

W4HA	149
W2GVZ	146
W4RBQ	142
W8ZMC	139
HC2JR	138
W9WCE	134
VE3AAZ	133
OA4AK	128
W3AYS	124
W2WC	124
W0RBA	122
SVIRX	119
MD5AK	118
W2BF	115
G2CNN	114
G2AKQ	112
W5CD	108
VE5JV	108
W2JA	102
W6ETJ	102
G2AO	100
W5BK	99
G6WX	95
OH3OE	83
GM2AAT	75

35 Zones

W4DHZ	132
W1BFT	130
W9CKP	124
W6ZZ	120
W9RQM	119
CO6AJ	119
W8AVB	119
W9LI	118
W9FNR	112
VE1PQ	111
W9DGA	108
FE8AB	107
W2HAZ	106
W0GBJ	101
W0FWW	99
KL7CZ	66

34 Zones

W41YT	127
W41IYT	127
W1MRP	104
OE1FF	99
W8JM	89
W9WEN	83
VE8AS	82
W8PCS	80

33 Zones

W4QN	110
G6QX	109
W2SEI	100
W8QUS	85

PHONE ONLY

39 Zones

W6DI	190
W6VFR	164
W7HTB	161
HB9DS	145
VE7ZM	145

38 Zones

W4CYU	173
W2BXA	172
W6KQY	139

37 Zones

XE1AC	180
W1JCX	170
W3LTU	169
W9RBI	166
W8REU	163
G2PL	154
G3DO	153
W6PXH	152
W6WNH	150
W8BF	146
W3JNN	136
W1HKK	136
W6TT	133
G6LX	124
G2AJ	121
F8VC	115
W6AM	107

36 Zones

W1NWO	163
W1MCW	157
VK3BZ	152
W7MBX	144
W4ESP	141
W9HB	139
W2D	135
W9BZB	135
W4INL	129
W1FJN	128
GM3UU	127
G6BW	127
W0HX	118
VE3BNQ	108
G5YV	106
G6WX	105
W3DHM	96
W6SA	92
F8DC	87

35 Zones

W4HA	140
W6PCK	135
PK4DA	132
W6CHV	128
W2RGV	125
G8QX	123
W2GHV	121
CE3AB	121
W9CKP	117
G3FU	115
W0PUE	114
W5LWV	108
W4OM	106
W3PA	105

34 Zones

W5KC	125
W8ZMC	122
W6UZX	120
W0EYR	120
W8BIQ	120
W4LZM	114
W9MIR	113
W1BPH	105
W8UIG	100
W41WO	99
W8QBF	92

33 Zones

W5ASG	134
W9RNX	131
HC2JR	128
W9MIR	118
W9WCE	117
W2ZW	115
W5ALA	114
W9HP	114
W0ANF	112
W4LZM	109
W0ANE	106
W2PQJ	100
W9BVX	100

In his first contest was W5LVD, assisted by W5LGG, with over 107,000 and around 260 QSOs. W8JIN has 306,000, while 205,000 for W9DUY looks awfully good. . . . W9LM scored 161,800. That old timer W8ZY never will give up, and got himself 180,000, while W9ANT added his up to around 150,000. . . . VE4RO, with VE4XO helping, and it wouldn't be a contest without him, got 179,800. . . . Then, there's fellows like MI3AB with 66,000, VO6EP 28,500, and DL1FF getting in there with 200,000. CE3AG netted 249,000 points and worked 520 stations. KG6DI almost wore out his bug in working 644 stations, netting around 281,700 points.

About the same thing happened this year that happened last; namely, conditions during the phone weekend were apparently not as good as the c.w. weekend. In any event, W3LOE scored 47,000 points, while the local situation looks like W6SA had 60,000 while W6GRL had 51,000 points. W6RM had 45,000 and W6DI worked 20 only for 23,000 points.

We will try to get out the official scores as soon as possible. Judging from the participation this year, it will be quite a job checking and tabulating the various logs. You can get a rough idea of the amount of work we have to do in order to whip these logs into shape, as there are first, second, and third place winners of the single and multiple operator stations, as well as in the all-band and single-band groups.

Some of you might be mildly interested in what went on at W6QD's during the contest. Well, like everyone that puts forth some effort in a contest, there are always many events that make it interesting, and we had our share at my shack. W6IFW worked with me, and since we both travel a bit, it looked doubtful as to whether I would make the contest on a full-time basis. However, in true contest form, all the final preparations were made the day before the contest, such as trying out a new final and putting up a 40-meter antenna. Fortunately, there were no bugs in the new final amplifier, but the first night practically everything else happened which took us off the air from around 10:30 P.M. to 6:00 A.M. Saturday morning. What a swell time we had repairing and rebuilding all night long. Anyway I read in a book once that that is what is supposed to happen during DX contests so the other guy can win. In spite of this, Lee and I made around 260 contacts with a score of 130,000. Well, I hope you guys had a good time in the contest, and I would appreciate any suggestions you have to offer.

We of *CQ* offer our sincere congratulations to the following in achieving WAZ:

152	VK4HR	Harry Scholz	40 - 169
153	OK1HI	Josef Hyska	40 - 153
154	W6OEG	Wm Rudolph, Jr.	40 - 200
155	W6EAK	Courtney Matthews	40 - 163
156	W6CYI	O. J. Mills	40 - 157
157	W6JZP	Don Jackson	40 - 168
158	W6SRF	Russell W. Davis	40 - 171
159	W6RLQ	Charles V. Boquist	40 - 132

W3JTK says he is going to clean up some of the loose ends of his station, now that the contest is over, and give his 813s a well-earned rest. W3JKO received a letter from a friend of his in Poland, and the following is quoted from this letter.

"In Poland there are now 5 licensed stations (some unlicensed can be heard). The calls I know are: SP1CM, SP5AB, SP1SJ. The SP1SJ is the only lucky boy from Poznan who got a license. There are still six other hams waiting for a ticket. SP1SJ will take part in the c.w. part of the DX contest on Sunday, November 6, although he got his license yesterday (hi). I have seen his license yesterday (he is a good friend of us.) He is allowed to use a maximum input of 50 watts on the 3.5 mc, 7, 14, 21, 28, 144, 420, and so up to the 10,000 mc band.

"I am just listening to the ten meter band and hear SP5AA calling CQ DX. He is also on 20, completely blocking the Rx. I think he has a strong harmonic on ten. We do not know who might be."

As far as W3JKO is concerned, he has added two good ones in ZS9J on 10 c.w. and FF8MH on 20 c.w.

Speaking of Bechuanaland, I had a letter from ZS9D who had just received a batch of QSL cards from the printer, and he wants all you fellows to know that in the future he will be able to QSL immediately after he gets your card. Ivan says all the cards he has mailed to date have gone through the various bureaus with the exception of where postal reply coupons were sent to him. He expects to be operating on both 10 and 20 by the time this appears in print.

W6PCK says he thinks he will get a TV set and quit looking over the band. After Mac has worked around 135 countries on 10 meter phone, the guy has to talk like that! . . . It's good to see W7PQS of Laramie, Wyoming, in the Honor Roll with 39 zones and around 140 countries.

CM2SW hopes to reach 200 countries by the end of the winter, and then he adds, "Even when I am now a married man. Hi!" I hope you guys understand what he means . . . F9QU/FM8 has sent word to us through a score of hams that his QTH listed in the November *CQ* is wrong, and we are very happy to print the correct one in the QTH section. Naturally, we're sorry this happened, but one of you fellows must have given it to me, as I certainly don't dream it up by myself. F9QU told W8SRS that, as yet, the French government hasn't granted his request to operate on Guadaloupe.

W4CYU is surely having his troubles getting cards out of certain stations. Apparently, the quantities of cards he has sent to them gets him no place . . . Here's one for you . . . W6PZ has been transferred to the 14th Naval district which will put him out somewhere in the Pacific. He figures to be in the Marshalls signing KX6BA. Fred also tells me that it could be that he would put out a squeak of a signal signing W6PZ/VRL. If this does happen, there is a good chance it will be on the Makin Atoll in the Gilbert group. You like it?

(Continued on page 72)

ZERO BIAS

(from page 10)

provided. The application shall, in addition to the foregoing, include a statement that the applicant can send by hand key (i.e., straight key or any other type of hand operated key such as a semi-automatic or electronic key), and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than that which was originally required for the class of license being renewed.

(b) The Novice Class license will not be renewed.

(c) The applicant shall qualify for a new license by examination if the requirements of this section are not fulfilled.

(d) The renewal application shall be accompanied by the applicant's amateur operator license, and also by his amateur station license if he holds one.

(e) Application for renewal of an amateur operator license may be filed not earlier than 120 days prior to the date of expiration and not later than a period of grace of one year after such date of expiration. During this one year period of grace an expired license is not valid. A renewed license issued upon the basis of an application filed during the grace period will be dated currently and will not be back-dated to the date of expiration of the license being renewed. This one year period of grace shall apply only to licenses expiring on or after January 1, 1951.

(f) Renewal applications shall be governed by applicable rules in force on the date application is filed.

Section 12.29 is amended to read as follows:

§ 12.29 License term.—Amateur operator licenses are normally valid for a period of 5 years from the date of issuance of a new or renewed license, except the Novice Class which is normally valid for a period of 1 year from the date of issuance. Modified and duplicate licenses shall bear the same date of expiration as the licenses for which they are modifications or duplicates.

Section 12.42 is amended in the following particulars:

1. Element 1 is amended to read as follows:

Element 1. Code test.—Ability to send by hand key (i.e., straight key or, if supplied by the applicant, any any other type of hand operated key such as a semi-automatic or electronic key), and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 13 words per minute, free of omission or other error for a continuous perid of at least 1 minute, during a test period of 5 minutes, counting five characters to the word, each numeral or punctuation mark counting as two characters.

2. A new element designated as Element 1(E) is added to read as follows:

Element 1(E) Code test.—Ability to send by hand key (i.e., straight key or, if supplied by the applicant, any other types of hand operated key such as a semi-automatic or electronic key), and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 20 words per minute, free of omission or other error for a continuous period of at least 1 minute, during a test period of 5 minutes, counting five characters to the word, each numeral or punctuation mark counting as two characters.

3. A new element designated as Element 1(NT) is added to read as follows:

Element 1(NT). Code test.—Ability to send by hand key (i.e., straight key or, if supplied by the applicant, any otheur type of hand operated key sch as a sem-automatic or electronic key), and receive by ear, messages in plain language in the International Morse Code at a speed of not less than 5 words per minute, free of omission or other error for a continuous period of at least one minute during a test period of five minutes, counting five characters to the word, each numeral and punctuation mark counting as two characters.

4. A new element designated as Element 3(N) is added to read as follows:

Element 3(N). Rules and regulations essential to beginners' operation, including sufficient elementary radio theory for the understanding of these rules.

5. A new element designated as Element 4(E) is added to read as follows:

Element 4(E). Advanced radio theory and operation as utilized in modern amateur techniques, including, but not limited to radiotelephony, radiotelegraphy, transmissions of energy for measurements and observations applied to propagation, to the radio control of remote objects and for similar experimental purposes.

Section 12.43 is amended to read as follows:

§ 12.43 Elements required for amateur operator license examinations:

Amateur Extra Class.—Examination consists of elements 1(E), 2, 3 and 4(E).

Advanced Class.—Examination consists of elements 1, 2, 3 and 4.

General Class and Conditional Class.—Examination consists of elements 1, 2 and 3.

Technician Class.—Examination consists of elements 1(NT), 2 and 3.

Novice Class.—Examination consists of elements 1(NT) and 3(N).

Section 12.44 is amended to read as follows:

§ 12.44 Manner of conducting examinations.

(a) The examinations for all classes of amateur operator licenses, except Conditional Class, will be conducted by an authorized Commission employee or representative at locations and at times specified by the Commission provided that the examination for Technician and Novice Classes may be conducted as set forth in (c) below under the following circumstances:

(1) If the applicant's actual residence and proposed amateur station location are more than 125 miles airline distant from the nearest location at which examinations are held at intervals of not more than 3 months for amateur operator license; or if the applicant is shown by physician's certificate to be unable to appear for examinaton because of protracted disability; or is shown by certificate of the commanding officer to be in the armed forces of the United States at an Army, Navy, Air Force or Coast Guard station and, for that reason to be unable to appear for examination at the time and place designated by the Commission.

(b) A holder of a Technician or Novice Class license obtained on the basis of an examination under the provisions of (c) below is not required to be re-examined when changing residence and station location within a regular examination area, nor when a new examination location is established within 125 miles of such licensee's residence and station location.

(c) Each examinatio for Conditional Class, and for Technicians or Novice Class licenses, under the conditions set forth in paragraph (a) (1) above, will be conducted and supervised by not more than two volunteer examiners, whom the Commission may designate or permit the applicant to select; in the event the examiner for the code test is selected by the applicant, such examiner shall be the holder of an Extra Class, Advanced Class or General Class of amateur operator license or shall have held, within the 5 years prior to the date of the examination, a commercial radiotelegraph operator license issued by the Commission or within that time shall have been employed in the service of tre United States as the operator of a manually operated radiotelegraph station. The examiner for the written test shall be at least 21 years of age.

Section 12.46 is amended to read as follows:

§ 21.46 Examination credit.—An applicant for a higher class of amateur operator license who holds a valid amateur operator license issued upon the basis of an examination by the Commission will be required to pass only those elements of the higher class examinaton that were not included in the examination for the amateur license held when such application was filed. However, credit will not be allowed for licenses issued on the basis of an examination given under the provisions of § 12.44(c).

An applicant for Amateur Advanced Class operator license will be given credit for examination element 4 if within 2 years prior to the receipt of his application by the Commission he held Class A privileges or an Advanced Class license.

An applicant for any class of amateur operator license, except the Extra Class, will be gven credit for the telegraph code element if within 5 years prior to the receipt of his application by the Commission he held a radiotelegraph first or second class operator license issued by the Federal Communications Commission.

No examination credit, except as above provided shall be allowed on the basis of holding or having held any amateur or commercial operator license.

Section 12.65 is amended to read as follows:

§ License period.—The license for an amateur station is normally valid for a period of 5 years from the date of issuance of a new or renewed license, except that an amateur station license issued to the holder of a Novice Class amateur operator license is normally valid for a period of 1 year from the date of issuance. Modified or duplicate licenses shall bear the same issue date and expiration date as the licenses for which they are modifications or duplicates.

The YL's Frequency

Conducted by LOUISA B. DeSOTO, W7OOH*

SOMETIMES FATE IS KIND, more often it would seem it isn't; but predict or change it we cannot. Thus fate has decreed that one of our YLRL members will no longer join us in QSOs or roundtables. On November 4th W5NMD, Mildred Coulter, of Tulsa, Oklahoma, passed away from injuries received in an automobile accident. Always a shock to learn such news, it was particularly surprising to us when we heard it on the 10-meter net, for we had only a short time previously received a most interesting letter from W5NMD.

Mildred came up with her ticket in 1947. Instead of her OM affording the incentive as is so often the case, W5NMD was undertaken at the suggestion of her oldest son (she had three other sons) who, when he left to make a career of radio in the Navy, proposed that she learn radio, too, so they could keep in touch via the ham bands. Mildred mastered the exam all by herself, though her OM encouraged her, and the local hams were generous in giving assistance. In her last letter Mildred not only displayed keen enthusiasm for her hobby, but described her novel method of racking her transmitter, suggesting we pass it on via *CQ*. We only wish W5NMD could read it here:

> *While visiting numerous ham shacks I noticed most home-built transmitters vary only in size and that most of them look alike. I wanted mine to look different, as well as costing as little as possible. The transmitter already had cost more than I had told the OM I would spend, and the day was nearing when I knew the cabinet for the rig must be discussed with him. He isn't a ham, so I had to think of a good sales talk for "another part." Fortunately he was in a good humor (good dinner—hi!) and said, "Put it in the electric ice box and keep it cool." We both stood there staring at the ice box, realizing that it was said for a joke but still it might be a good idea. The OM said, "Come on," and as he rushed me out the door I grabbed a yardstick, and we headed for the nearest second-hand store.*
>
> *The dealers thought we both were a bit "touched in the head" when they showed us an ice box and elaborated on its qualities for keeping ice and we replied that we wanted a GOOD ice box but NOT to keep ice, and proceeded to measure height, depth and width with the yardstick. To tell them we wanted a transmitter cabinet and that I was a ham—well, we were glad we couldn't quite understand what they muttered under their breath. To our amazement and delight it was easy to find a metal ice box in which the standard 13" x 17" chassis and 19" panels would fit.*
>
> *We purchased the box at very small cost. It wasn't much trouble to tear out the insulation and build shielded racks for each section. The OM then painted it a silver grey, put it on heavy metal casters, and from then on it was easily completed. Between the panels we put chrome strips which not only add to the beauty of the cabinet, but also provide shielding over the open cracks. We used the frame of the ice box door, covering it with copper screen wire to put a screen door on the back of the cabinet.*
>
> *By the way, the transmitter is 200 watts to a single 813, pair of 805s in the modulator, incorporating an 866 negative peak clipper. The speech amplifier is in a separate cabinet on the operating desk and, surprise, it works!*
>
> *This is the old ice box station, W5NMD, signing out.*

Front row: Eleanor Baldwin, W6AWW; Jean Baptie, W6ZXD; Neva Fredenburg, W6XXI. Back row: Evelyn Scott, W6NZP; Helene Leonard, W6QOG; Blanche Weiss, W6BLF; W7OOH, your column editor; Ellen White, W6YYM; Genevieve Malette, W6EHA.

Southwestern Division Convention

Little did we think when we attended the Southwestern Division Convention last year that we would be able to do so again this year, but thanks to the invitation of the San Diego YL Club, and with the cooperation of *CQ* and Verde Valley School, we did just that. The first affair of its kind held in San Diego for some thirteen years,

(Continued on page 50)

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*Associate Editor, *CQ*. Send contributions to L. B. DeSoto, Verde Valley School, Sedona, Arizona.

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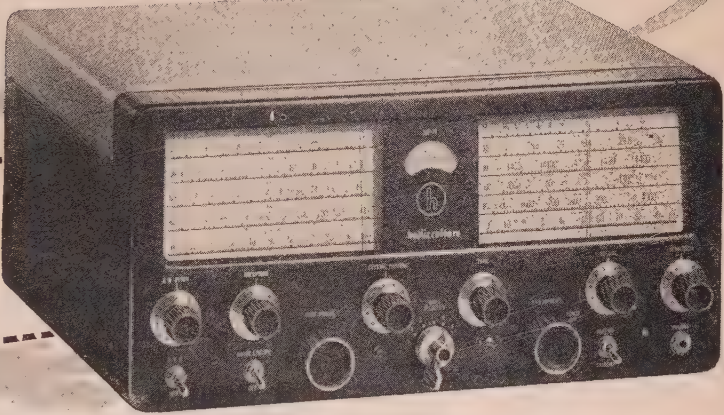

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YL's FREQUENCY

(from page 48)

it was a huge success with a big crowd, good contests, fine prizes, excellent food—and, of course, lots of YL gabfesting! Held in beautiful Balboa Park, the YL activities were centered in the House of Hospitality. There the YL club had an appetizing luncheon for the YLs and XYLs at which the XYL of W1BUD and your column editor were guests of honor. Following the QLF contest (in which W6YYM, Ellen, and W6QOG, Helene, took part, and which Helene later insisted had caused her a "glass leg"), the YLs held a ham session before joining the open forum, banquet and entertainment. Seven girls came down from the Los Angeles area; W6QOG, Helene Leonard; W6NZP, Evelyn Scott; W6CBA, Violet Sasse; W6YZU, Naomi Turk; W6EHA, Genevieve Malette; W6-EWV, Donna Cleaves, and W6MA, Bertha Wallace. Five from the San Diego area included: W6ZYD, Jean Baptie; W6YYM, Ellen White; W6YXI, Neva Fredenburg; W6AWW, Eleanor Baldwin, and W6BLF, Blanche Weiss. W7OOH brought the number to a lucky thirteen.

All of the San Diego girls worked hard on the convention, and W6ZYD did a fine job as chairman of the YL program. W6ZYD and her OM, W6-AMQ, also were kind enough to put us up for the weekend, so we had a chance to meet their three jr. ops, work their station, and ragchew. After learning that W6ZYD had held her ticket since 1947, we then asked W6AMQ how long he had been licensed. "Oh, Jean had her ticket first," answered Boyde, much to our surprise. Seems he's taken quite a razzing about it, too. They attended radio classes together and practiced code with each other, but when they went down for the exam, Boyde muffed the code on the first try, so Jean came up with her ticket in July and Boyde followed with his three months later. Now W6AMQ prefers to operate c.w. (Jean won him a bug as a prize at the convention), while W6ZYD likes to ragchew on ten.

YL-OM Contest

Here are the details of that contest you've been awaiting—open to all OMs as well as members of YLRL. Sponsored by YLRL, it is scheduled for January, and these are the dates and frequencies: PHONE: January 21-22, from 0700 CST on the 21st to 2400 CST on the 22nd, on 75, 20 and 10. C. W.: January 28-29 as follows: 28,000-28,100 kc, 14,050-14,150 starting 0700 CST on the 28th and ending 1900 CST on the 29th, 3600-3700 kc, 7100-7200 kc starting 1900 CST on the 28th and ending 0700 CST on the 29th. On phone call "CQ YL-OM Contest," and exchange QSO number, time and location. On c.w. the YLs call "CQ OM," and the OMs call "CQ YL," and exchange QSO number, time and location. For scoring, count one point for each contact. Multiplier shall be each State, Territory, Country of VE Province, but the multiplier shall count only once, regardless of the bar operated. A contestant may operate any bands, l must return separate scores for phone or c Prizes will be awarded both to OMs and YLs f top scores. To be eligible for prizes, the YLs m be members of YLRL, but all licensed OMs a eligible. Mail your contest logs not later th February 5, 1950, to YLRL Activities Manag Anabel Gifford, W3NNS, 26 Waverly Av Morton, Pa. You also may obtain extra copies the rules from her.

YLRL Nets

Also from W3NNS we learn that each meml of the c.w. nets having the most participants the season will be awarded a certificate, static being counted once each net period. And for YL being most active on the 10-meter phone n a certificate also will be awarded. In each case season will start as of December 1st and run ur further notice.

For those of you who haven't yet participat in the YLRL nets, here is a summary of the operating at present:

Band	*Day*	*Time*	*NCS*	*Fr*
80 c.w.	Wed.	8 p.m. PST	W6SLT	3
80 c.w.	Thurs.	11 p.m. EST	W3AKB	3
40 c.w.	Wed.	11 p.m. EST	W3NHI	7
20 c.w.	Thurs.	11 p.m. EST	W3CUL	14,
10 phone	Tues.	8-9 a.m. EST	W3NNS	28,
10 phone	Tues.	1-3 p.m. EST	W3NNS	28,
(As above, alternate net control)			W8ATB	29,
(As above, alternate net control)			W6GAI	28,

Here and There

We hear that W2QHH at last has worked a in West Virginia to complete his WAS/YL. Co gratulations, Howy!

On the evening before the Southwestern Divisi Convention W6YYM held open house for the S Diego girls and your column editor. Two of guests were Ellen's students in her radio class, a she reports they're 'most ready for the exan good work! Ellen, herself, is attending ra school and is justly proud of the superheterody receiver she just completed.

ZS6GH is now YL editor for *Radio ZS*. In recent letter Diana says there are only 35 operators in the Union of South Africa, the o active club being the one in Johannesburg, of wh she is chairlady and ZS6KK, Marie, is secreta and which celebrated its first birthday in Septeml Adds Diana: "CR7ND, Nellie, is also a mem of our YLRL. Although CR7 may be rare DX you, we hear this country all the time, being ab 384 miles from here." The ZS YLs who can heard on 20 and 10 during the DX season a ZS6LK, Mae; ZS6KK, Marie; ZS2AA, Iris; Z 5DF, Meg; ZS2EC, and ZS5DZ, Bee. ZS6AA worked over 100 countries and received her h dredth card for DXCC.

Thanks to W7JYY, our own station, W7OC is on the air. Giving an assist on the antennas W7PDA. His XYL, by the way, was W7MU Rita Lemke, who we were very sorry to le joined the silent keys several months ago.

# of Transmitter Kits and TVI Filters

Transmitter
Dual Filter
—TVT-62—

At the Hudson Division Convention over 3,000 radio amateurs saw our TR-1 300 Watt Phone and CW transmitter using our dual TVI filter operating on 10-meter phone 28,686 KC and simultaneously watched the World Series—Channel #2 on television.

Measurements by certified equipment on amateur transmitter using our dual filter operating on 11 meters (the worst possible band for TVI) showed a fundamental signal strength of 612,000 microvolts per meter, with no measurable second harmonic. This was not a relative test, but a certified measurement using the latest RCA Field Strength Meter and recorded in actual Government records.

Come in to Harvey or Eldico. Either store will give you an actual demonstration. Come in and prove to yourself it really works.

Television Receiver Filter
Available—TVR-300 For Twinex
TVR-62 For Coax

HERE'S HOW WE DO IT

W2UOL's Eldico has gathered together all of the dope on TVI-ing, all of the data written by experts and then with Eldico engineers collaborated, rewrote, tried and experimented and compiled their own "TVI Can Be Cured" booklet. It's now coming off the presses and available free for just a penny postcard requesting it. Available in quantity for clubs and organizations. Be sure to get your free copy before they are exhausted. Write either store.

LICK TVI— FOUR WAYS

1. By complete shielding to prevent direct radiation from the transmitter.
2. By the use of line bypasses and brute force line filters to prevent kickback through the AC lines.
3. By the use of W2GX's M derived Low Pass Filter to prevent radiation of harmonics through the antenna.
4. By the use of W2GX's M derived High Pass Filters to prevent the overloading of the front end of the television receiver by amateur fundamental signals.

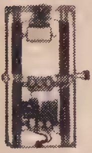
HERE ARE THE TOOLS

- **Transmitter Dual Low Pass Filter**
  40 Mc cut off—over 75 db harmonic attenuation. 52-72 ohm input and output. For use at other impedances use an antenna tuning network. Good for 1 KW input—Negligible fundamental attenuation. No effect on antenna performance.

Model TVD-62 ....$ 7.99 in kit form
Coax Dual Filter 10.99 wired and tested

- **Receiver Hi Pass Filter**
  40 Mc Cut off—No attenuation to signals above 40 Mc. Efficient on any manufactured set. Will not affect picture, quality or strength. Available for coaxial or twinex installation.

TVR—300 for Twinex... } $1.98 in kit form
TVR—62 for coax...... } 3.98 wired and tested



- **Brute Force Line Filter**
  Similar to ARRL's—Page 508 ARRL Handbook 1949 Edition. Will handle 1 KW—Completely filtered and shielded.

$5.98 in kit form
8.98 wired and tested
(Add 25c To Cover Packing and Shipping Each Filter.)

- **R.F. Shielding—Copper Mesh**
  The same type as we used in our TVI-Proofed TR-1 shown at the ARRL's Hudson Division Convention. Heavy Duty—tightly wound—It's expensive but the only thing we know which will do the job. Minimum order—6 sq. ft. 36″ wide lengths. Per Sq. Ft. $.85 plus $.50 shipping charge regardless of quantity.

- **Shielded Cable**
  Multi conductor—To reduce radiation via power leads, all cables must be bypassed and shielded. 2, 3, 8 and 9 conductor shielded cable available—#20 wire 600-1000 volts insulation.

2 conductor .07 per ft.	$5.00 per 100 ft.
3 conductor .08 per ft.	4.25 per 75 ft.
8 conductor .15 per ft.	12.00 per 100 ft.
9 conductor .16 per ft.	12.50 per 100 ft.

- **R.F. Bypasses**
  All AC Leads, power leads, relay and switch leads and every connection between chassis should be bypassed. Use our Hi voltage Ceramic for Hi Voltage, our button or feed thru's for medium and low voltages, our micas for AC, relay and switch leads.

HI VOLTAGE CENTRALAB 7500V working—50 MMFD. Tapped for 6/32 screws—The best for RF bypassing—$.89 each.

BUTTON CONDENSERS—available in various ranges and capacities. Automatically grounded through mounting screws

50, 100, 180, 500 MMFDS	$.18 each	$1.80 per dozen
2400 MMFD	.25 each	2.50 per dozen

FEED THRU CONDENSERS. Just insert in hole in chassis, tighten nut and you have a feed through connection which is automatically bypassed to ground. Available in 50, 55 and 75 MMFD with nuts. 15c each—$1.25 per dozen.

Ceramicon Condensers—Axial type—Temperature compensated. Ideal for usage in small spaces—Available in 2.2, 3, 5, 15, 25, 50, 100 and 300 MMFD.........$ .15 each
1.25 per dozen

R.F. BYPASSING COMBINATION #1
Enough to do a thorough job on any amateur transmitter—Contains 6 Hi voltage ceramicons, 20 button 30 feed throughs and 20 ceramicons. A $16.00 combination for $8.95 per kit.

SHIELDED CABLE—COMBINATION #2
Contains 25′—2 conductor shielded Cable, 25′—3 conductor Cable and 25′ of 8 or 9 conductor cable (your choice).
A $8.55 combination for $6.95

TRANSMITTER FILTER COMBINATION #3
Contains one TVT-62 Dual Transmitter Filter, two TVR Receiver Filters (Your choice of 300 or 62 ohms) and one Brute Force Line Filter.
A $17.99 combination for $14.98 in kit form
A 27.93 combination for 22.50 wired and tested

COMBINED COMBINATION
Contains combination 1, 2 and 3 plus 12 square feet of H.V. duty copper screen—It's all of the material to really clean up the Kw rig.
A $41.58 combination for $35.00 in kit form
A $49.10 combination for $39.00 wired and tested

All in stock for immediate delivery.

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FIELD PHONES
EE-108—Talking range 9-12 miles. Requires NO batteries or current has crank and generator for signaling. In New Leather Case. A wonderful buy. 2 Phones.
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VFO CAPACITOR
High Grade Unit. Consists of 8 Gang Capacitor. 20 mmf per sect. Ceramic ins. Low drift w/Worm Gear (reduction) 120:1 w/ext. Shaft and Veeder 4 digit Counter. **$3.95**

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BC312, BC 342 .... **$1.25**
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HEADSETS
Dynamic mike and headset combination. A high quality, efficient unit, used in B-19 tank Xmtrs. Mike and phones complete, new........ **$2.75**
Headbands: HB-1, HB-4, HB-30. **New. 25c ea.**

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TR 1210, 12 vdc, 5 pin........ **$1.00**
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Mal. Type G534C, 12 vdc, 5 pin.... **1.00**
Mal. Type G629C, 12 vdc, 4 pin.... **1.00**
Ra'diart VR2, 6 V. DC., 6-pin spec. **1.00**
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T-102, No. 55545 T-104, No. 55547
T-103, No. 55546 T-105, No. 55554
T-206, No. 55530
Price, each **95c**

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UNIVERSAL OUTPUT: American ohms. Sec: 500/15/7.5/3.85 ohms, Silcor, PRI: 20,000/16,000/5,000/4,000 30 db, content Flat to 17,000 CY........ **$2.75**

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Carbon transmitter element for TS11-J. TS11-L, TS13-E, TS15-A........ **75c each**
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Rect. Dual Input 2.2V @ 1.5A; Out w/6.5V for SCR593-BC728. Price **$1.49**

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40-80-160 MTR 14-18 MC, 8-10 MC, 2-3.5 MC, 5-7 MC .... **$1.19 ea**

Transformer for 7" & 9" Scope
115 v 60 cy. Sec. 3000v/5 MA, 720 VCT/202 MA, 6.4v/8.7A, 6.4v/.6A, 5v/3A, 1.25v/.3A with wiring Diagram........ **$4.95**

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wound up 28 QSOs in all but W0 districts. After about two hour's operation, I had to take a few minutes out to run cold water over the core of my line xmfr, as it was roasting hot and hummed so bad I was afraid it would awaken people in other rooms. The receiver was the same one used with SV6AA on Crete, 1T4 and 3Q4 with 45 volts B battery and two flashlight cells for filaments. I had to keep my log on my lap, as there was no more room on my two-by-two table. I didn't bother turning off the room light, as it was only a 25 watt bulb, and I'm sure couldn't be seeen under the door.

The second morning on, I worked 38 different stations besides Ws. I QSOed VE7ZM, CM2SW, and G5UX, who was my last contact on Tuesday, October 4th. The following morning, the band was so dead, I thought it was my receiver and fooled around with it; burned out my tubes. Fortunately, I had spares. Anyway, no contacts were made that morning, and I departed by boat at 11 A.M.

I am sure now there is no way of stopping 99% of the DX boys from being hogs. They just start a chain reaction calling a DX station, and the QRM just keeps increasing. My solution is never to work more than one station on the same frequency but to look around after every QSO.

Sorry I couldn't stay the full week like I had planned, but I had an obligation at home. Anyway, the band was dead all the rest of that week."

W7MBW and W7MBX (all the same guy with separate stations, one in Portland and the other one 21 miles outside the city) has had a batch of QSL cards printed for AC3SQ and has sent them over to him. Some of you fellows should be receiving yours by this time.

VR2BC, like practically all VR2s, will QSL after first receiving your card. He said the percentage of returns used to be so poor that practically all VR2s follow this practice. He, likewise, sends all W and VE cards through their respective bureaus. VR2BC says that there is another station signing that call once in a while on 20 c.w., and he is a pirate; there are also several other VR2s who are pirates. There are no three letter VR2s. VR2BK is a good one, VR2AQ has returned to ZL, and VR2AP is off the air now, but will be back from ZL sometime in January.

A letter from VR2BH says that the 10-meter men are VR2BL and VR2BC, while VR2AP operates 20-meter phone. The c.w. men at present are VR2BF and 2BH, both working 20 meters. From what Doug says, VR2AS, 2BG, and 2BJ are on the other side of the island in Suva, as is VR2BK. You may remember VR5IP on Tonga. Well, he is now a VR2 and will have his rig set up very shortly. You may also remember he recently took unto himself a wife, and this has had some effect in keeping him off the air. Recently, VP8AK told VR2BH that he was going back to England, and all cards should be sent via RSGB. As far as Doug is concerned, he can generally be found on

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LOW PRICES: I guarantee to sell to you as cheap or cheaper than you can buy anywhere.

COMPLETE STOCKS: Collins, Hallicrafters, National, Hammarlund, RME, Millen, Harvey-Wells, Meissner, Gonset Meck, Johnson, RCA, all other amateur receivers, transmitters, beams, TV, AM-FM, high fidelity amplifiers and speakers, test equipment, tubes, parts, etc. I can supply nearly any equipment shown in any catalog or advertisement and at lowest prices.

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TEN-DAY TRIAL: Try any receiver ten days—if you return it your only cost is shipping charges.

PERSONAL ATTENTION: The Butler store is run by Bob Henry, W0ARA, and the Los Angeles store by Ted Henry, W6UOU. We make the deals ourselves. We finance the time payments ourselves. That way we have the lowest overhead and can do more for you. That's why YOU AND I CAN DO BUSINESS. Write, phone, or visit either store. 73,

Butler, 3, Missouri

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"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS"

14,032 or 14,072, although, as he says, his 25 watts sometimes do not make much of an impression.

W4LZM heard W8HRV that ZS9F will spend another three months in the Protectorate . . . W4HA was told by ZS3M that there are now 14 licensed stations in South West Africa . . . ZD4AV is a new phone station which some of the boys have been working.

Before going any farther, please refer to the new QTH for the DL4 QSL bureau as shown this month in the QTH section. This is the official address of the bureau which will handle cards for all American and Allied personnel now operating in the American zone of Germany.

W6RM, during the recent phone section of the contest, heard so many stations say "by on the band," he wants to know who in the world coined this phrase, as it ranks along with "what's the handle?" and "dump her in, Joe." Smitty, you're a man after my own heart!

G6QX has started to TVI-proof his 4 final amplifiers. As yet, he says he has had no complaints from neighbors, but figures when TV gets into the regular BC hours, it will be a different story. Bob then hastily adds that his TV neighbor has put his house up for sale, while the neighbor on the other side has gone away. And he wonders why! As Holmes would say, "Quick, Watson, the needle!"

W9WCE worked a few good ones on 10 phone; UA1BE, ZS8A, MD2B, MF2AA, FF8PG, VQ4-AQ, and VQ5ALT.

VK9NR has signed off at Norfolk Island. Noe expects to turn up eventually at ZM6, but in th meantime he will be in New Zealand. Last QS from Norfolk was with W4KRR. Noel says som of the boys get a bit careless in filling in the dat on QSL cards, as they don't agree with his lo . . . in fact, he can't find many of them at all VK9RH is active on 14040 until his VFO arrives He will be on Norfolk for a couple of years Maybe I should say . . . "keep an eye on this spot and you might find out when Noel will open u as a ZM6."

MP4BAL, whom we might remember too a W6PVB, Bob Leo, went visiting in Italy, an while in the city of Florence, met and married Dutch girl. They spent a very enjoyable thre weeks visiting the sights in Rome, Florence, an Venice. They also met I1KN and I1IT. Bob tell about visiting many interesting places there, including moonlight rides on the canals in a gondola You can sure tell the guy had some of this romanti haze hovering over him when he writes like that All is not lost, however, because, as Bob says, Cobi his XYL, has gained a favorable impression o ham radio. For the time being, she is going t stay in Holland while he remains at MP4BAL During this time, Robert claims she is going t learn the code. MP4BAL should be on the ai during December on a frequency of around 14099 His QTH will be found elsewhere.

W4LVV calls my attention to the fact that the Miami gang is really in there trying. He point

CQ BINDERS $2.00

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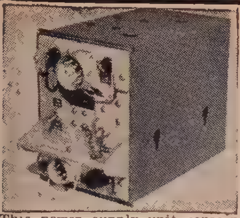

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12 or 24 Volt DC input; output 275 Volt 110 MA.; 500 Volt 50 MA. Completely filtered and housed in metal case. These units originally used with MARK II No. 19 radio sets and cost Govt. $150.00. The dynamotors will operate on 6 VDC at approx. half the voltage, thereby giving you a good motor for car shaver or AC-DC radio operation and a power supply for your mobile receiver from your 6 Volt auto battery. This power supply unit contains all of the items described in the column to the right. Size: 8" H x 6" W x 10" D. Shipping Weight: 62 lbs. Price:- Complete unit—
Order No. CPS #3 .... **$5.00**

Each Unit contains the following parts which may be purchased separately:

1—Dyn. 12/24 V input; output 275 V 110 MA. .	**$3.95**
1—Dyn. 12/24 V input; output 500 V 50 MA. .	**2.95**
8—.1 500 V Oil Tubular Cond.	**1.00**
2—.1 1000 V Oil Tubular Cond.	**.50**
2—15 MFD. 400 V DC Elect. Cond.	**.80**
1—DPST 15 A. Toggle Switch	**.40**
1—3PDT 20 A. Toggle Switch	**1.00**
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1—Pilot Light 12 V & Holder	**.20**
5—Filament & RF Chokes	**1.00**
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Also—Resistors, Plugs, Panel Chassis, Cable, Case, and Grill	**3.00**

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A. MP-132—1" heavy coil spring, 2" insulator. Overall length: 11½". Weight: 2¾ lbs. Price: . . . **$3.95**

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MAST SECTIONS FOR ABOVE BASES: Tubular steel, copper coated, painted, 3 foot sections, screw-in type. MS-53 can be used to make any length, with MS-52-51-50-49 for taper. Price—any section.............. **50c Ea.**

CANVAS BAG BG-56 for carrying above 5 mast sections.......... **Ea. 50c**

CO-213 CABLE — Seven Conductor #20 AWG., two cond. separately shielded within an outer shield for all 7 cond.s. Insulated, rubber covered, 35 Ft. length...... **$1.25**
4 Cond. Cable - rubber covered, shielded, 50 Ft. **$2.00**

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680 volts 210 MA. output at 12 Volt DC input. 6 VDC input; 300 Volt 150 MA. output. As illustrated. Size: 7" x 4" #DM-680. Price: **$7.95**

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New Transformers and Chokes:

TRANSFORMERS (Cased)—115 V.A.C. 60 CYCLE INPUT.

OUTPUT: 750-0-750 V.A.C. (600 V.D.C. after choke input filter at 250 MA.) Includes 6.3 V.A.C. winding at 5 amps and 5.0 V.A.C. winding at 4 amps. CH-106............ **$7.95**

OUTPUT: 625-0-625 V.A.C. (500 V.D.C. after choke input filter at 250 MA.) Includes 6.3 V.A.C. winding at 5 amps and 5.0 V.A.C. winding at 4 amps. CH-107............ **$7.35**

OUTPUT: 600-0-600 V.A.C. at 250 MA. 12 V.A.C. at 3 amps; 12 V.A.C. at 3 amps; and 5 V.A.C. at 3 amps. Designed for Army surplus transmitters. CH-108............ **$6.90**

OUTPUT: 250-0-250 V.A.C. at 60 MA. 24 V.A.C. at .6 amps; 6.3 V.A.C. at .6 amps. Designed for Army surplus Receivers. CH-109........................... **$3.00**

OUTPUT: 6.3 V.A.C. at 6 amps. CH-110.......... **$2.25**

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CH-121—15 Henries at 250 MA. filter choke, 1,500 volt insulation **$4.95**

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BC-442 Antenna Relay Box with Cond.		**2.95**
TRANSFORMER f/Comm. Trans. See CH-108 above		**6.90**
CHOKE - 15 Hy. 250 MA. No. CH-121		**4.95**

BC-645-A Transceiver—

ALSO 110 VOLT TRANSFORMER AND CHOKE

15 Tube Transceiver, ideal for conversion to 460 MC. Frequency coverage 435 to 500 MC. With conversion instructions - Price. New and Boxed **$14.95**

TRANSFORMER for BC-645-A — 110 Volt 60 cycle input output 400 Volt 150 MA. after filter. 12, 9, and 6 V. AC. 4 amps and 5 V. 3 amps. No. CH-645...... **$6.95**

CHOKE — 15 Hy. 150 MA. Order No. CH-646 ..... **$2.95**

TRANSFORMERS — 110 VOLT 60 CYCLE PRIMARIES:

Sec. 12 V. 1 amp... **$1.50**
Sec. 24 V. 1 amp... **1.95**
Sec. 24 V. 2 amp.... **2.25**
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Sec. 36 VAC 2.5 amp. **2.95**
Sec. 14-14 or 28 Volt—7½ or 15 amp........... **4.95**

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out the standings of the following W4s in Miami: DKA, FPK, RBQ, IYT, and LVV. Take a look in the Honor Roll . . . you'll see. While I am thinking of this Miami gang, you fellows, of course, know that VP5BF is the new call of VP5XX, and W4LVV still handles the cards.

W9LM is trying to find out the zone in which UA0KSB is located. Eighteen is the number in case you, Hal, and some of the other boys want to know.

W6NTR says he is so happy because he has worked his last zone that he doesn't care if the last two cards do come by ox cart. He should know at least that the last one always does . . . W6ZZ has his rotary stuck in one direction due to oil in the rotater leaking over the brushes in the motor. He says he is discouraged. Of course, we know that is just temporary.

The following rules cover the South African International DX Contest, and it will be held over the last two weekends in January.

South African DX Contest

January 1950

GENERAL: The S.A.R.L. International DX Contest which is now established as an annual event will be staged during January 1950.

All licensed amateurs throughout the world are eligible and are invited to participate in the Contest.

All overseas amateur organisations are requested to give this contest the greatest possible publicity, and so contribute towards a successful contest.

The contest is divided into C/W and Telephony sections.

The C/W section commences at 00.01 hrs. G.M.T. on Saturday the 21st January and closes at 23.59 hrs. G.M.T. on Sunday the 22nd January 1950.

The Telephony section commences 00.01 hrs G.M.T. on Saturday the 28th January and closes at 23.59 hrs G.M.T. on Sunday the 29th January 1950.

Rules of the Contest

1. All entrants are bound by the rules governing this contest and, in the event of a dispute, the decision of the President of the S.A.R.L. shall be final.
2. Operation is restricted to the 40, 20, 10 meter bands. Cross-band operation is not allowed.
3. Contacts with Government or unlicensed stations are ineligible for scoring purposes.
4. Proof of off-band or irregular operation submitted by the official stations will disqualify the offender.
5. SERIAL NUMBERS **which will be changed with each contact** are to be exchanged between stations. In the case of C/W stations the serial will consist of a 6 (six) figure group, the first three figures to be the report followed by the LAST three figures of the LAST SERIAL NUMBER RECEIVED. For your first contact simply add any three figures to the report to be given. For subsequent contacts give the report followed by the serial number of the last station worked.
6. SCORING will be as follows: Two points for each station worked in your own country. In the case of Africa VQ 1, 2, ZS1, 2, 3, 4, 5, 6, 7, 8, 9, ZE1 and 2, CR7 count 2 points, making the contest virtually Southern Africa vs the World. Five points for each station worked in other countries (See A.R.R.L. list). Multiplier is the number of countries worked on ALL bands.
7. Logs are to be sent to: H. R. Bennett, 47 Flower Street, Pretoria, South Africa.
8. The contestant must submit a logsheet which will have an analysis and a signed declaration. The declaration to be as follows: "I hereby declare

(Continued on page 84)

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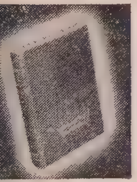

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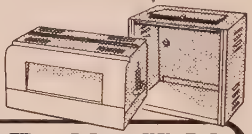

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WRITE FOR CATALOG

ZIG-ZAG BEAM

(from page 19)

ratio was not considered objectionable for the 1 foot total length of the line in use. If long tran mission line runs are necessary, it would be d sirable to improve the match at the antenna wit either a quarter-wave matching transformer or section of tapered line. The antenna may be fe with 50- or 70-ohm coax through a matching se tion and balun. This method of feeding was use in the original test.

The initial tests of this antenna were made 1/10 scale at 1450 megacycles with the test a tenna constructed of bus bar. The patterns we measured on automatic recording equipment sy chronized with the supporting mast, which w motor driven to rotate on two axes. The ease a speed of making measurements on the model ga the opportunity to investigate various feed point the effect of changing supporting members a bandwidth, and correct element length. As a matt of note, the bandwidth for the antenna describ with quarter-inch elements is approximately 10 pe cent, or 14 megacycles at 140 megacycles. T element lengths, as might be expected, agree qui closely with the value computed by the standa long-wire formulas for each of the four two-wav length sections. With the bandwidth involved, how ever, the element lengths are not critical and a roughly the same as free-space lengths. No prunin or adjustment should be required.

The performance of this antenna in the ni months of its operation has been extremely goo Although the gain is theoretically about two below that of a full 16 element beam, the ease construction, lack of insulators and phasing line light weight, and simplicity far outweighed t small difference in gain for the writer.

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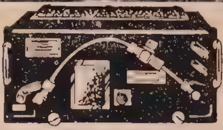

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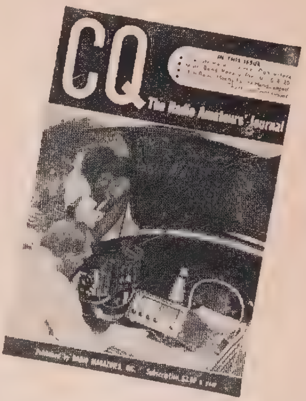

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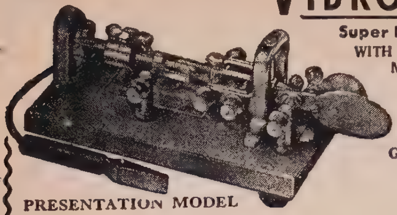

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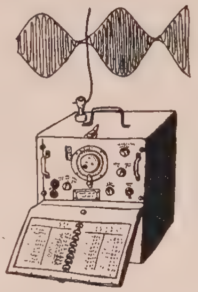

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DX and OVERSEAS

(from page 80)

that my station was operated strictly in accordance with the conditions and rules of this contest and I agree to abide by the decision of the President of the S.A.R.L. in the event of any dispute."

9. An incomplete log or omission to submit an analysis or failure to make the declaration will disqualify the contestant.
10. The judging will be done by the S.A.R.L. Contest Committee.
11. The log sheets must show the following: Date. Time of Contact. Band used. Call sign. Serial sent and received, points claimed. Multiplier. Number of countries worked.
12. All logs are to be in the hands of the S.A.R.L. Contest Committee by April 30, 1950.
13. Certificates will be sent to the Winners of this Contest in each country outside South Africa.

PLEASE GIVE THIS CONTEST YOUR SUPPORT
Chairman, S. A. R. L. Contests.

W1NWO and W1ENE are building identica kilowatt final amplifiers using 4-250As. Willar says the TV brethren are already organizing t oppose the operation of their new rigs

KH6VP finally decided to put up his old bear and increase his power, and as a result, he no has 39 zones and around 130 countries. Bill say he hopes none of the Ws or, for that matter, an other stations, think he is snooty, because, in th last few months, with his extremely low power, h has been concentrating on new countries and ne zones. Fellows, just for the heck of it, let's a think he is snooty.

W4LVV worked a station signing ZA1A. Chuc got a QSL card all right in answer to his. On directly from the Chamber of Commerce, or equa giving all the broadcast schedules, time signal sitting up exercises, etc.

W5FXN has started for WAZ about 10 time but about the time he gets well under way, he shift QTHs and has to start over. Well, he is no longe bothered with this traveling bug, and is now wit a radio parts house in Austin, so figures he will b able to do a little more DX from here on in. Ji says he gets a little griped when someone steals DX station from him during the middle of a QSC I can't understand why. Can you, gang? Oh, ye here's something else. Apparently VP1AA has lot of coax cable he would like to get rid of, an he might even do it gratis, F.O.B. his QTH Remember now, I am not guaranteeing this. It only what I heard.

W4GG picked a couple of good ones in FQ8S and FN8AD . . . W9RNX, who operates 10 phon tells me that UB5BV apparently will not answ a station calling on the same frequency as the o he has just worked. He says this makes it toug for the low power guys. Even so, Russ has 33 zon and 131 countries . . . W6ETJ took a suggesti from ENV and has been getting up earlier. Resul 5 new countries!

W6DI received a very interesting letter fr MP4BAD. It looks as though he has left Truci Oman and would like all QSL cards sent throu RSGB or direct to his home QTH in Englan In any event, do not send any cards direct arjah. He also says that MP4BAB and BAC ve gone for sometime, but cards have continued arrive for them. Since both of these fellows are o members of the RSGB, it would be much tter to send the cards via this medium. Another of news relates that MP4BAE is active on 10-eter phone, and his QTH will be found in the ual place. Here is something that is important. P4BAM is in the Sheikdom of Qatar and oper-es 20 c.w. . . . QSL via RSGB only, and do not nd any cards direct. MP4BAD says that Sharjah rt is a civilian establishment and not R.A.F. pparently, this is different from the QTH "R.A.F. arjah" which he has been using. I wouldn't be surprised if you hear Ken on the air with a G ll around the first of the year.

F8BS, since he became the proud father of a ughter, is back chasing DX and adds a few to s list of countries.

If any of you fellows worked ZS6VMO, here's e story. This station was on the air three days d was specially licensed for the unveiling cere-ony of the Voortrekker Monument near Pretoria. ecial QSL cards of unique design will be sent every station contacted by ZS6VMO. All QSL ould be sent via ZS6T. I would have liked this nouncement to have been in last month's issue, t, unfortunately, the letter from ZS6T did not rive in time.

W2HMJ has received cards from PJ5RX and J5FN. He also sent 300 cards to ZK2AA, which, doubt, will be appreciated . . . W1ENE got red of running out into the back yard and turning s beam by hand, so he fixed the darn thing and orks it from the shack. Well, what do you know! W3KZQ will probably show up as a CN8 before ng, if he hasn't already. His new QTH will be und . . . well, you know where.

HC2JR adds quite an imposing list of countries, on phone, and some of the best are CR5UP, F3SF, ZS9F, ZS3Z, and W2EJV/PK3 . . . W9-N, after 29 years of hamming in apartments, ll blossum forth from his own home about the st part of February. Since he likes 40, he is anning on a 7 mc vertical. Every time I think a vertical, it reminds me of a situation 12 or 15 ars ago where a certain guy was asked how he ed the vertical. He said, "Fine. It's equally lor in all directions!" Of course, after a remark e that, I expect an influx of letters telling me at a jerk I am, because "look at all the DX that s been worked with a vertical antenna." Fellows, nest . . . I didn't say it. I'm only quoting.

On a recent business-pleasure trip East, W6OEG uldn't resist dropping into some of the New York dio supply houses. Guess he met a couple of Xer's, one of which was W2BJ. There's a guy u see almost anywhere. OEG's wife tells me it s a very enjoyable trip, but I presume she meant er their departure from the radio stores. Who d that?

A laugh was had at the DX meeting in San ego last week during the Southwestern Division nvention. W6ANN passed out a DX quiz sheet, e questions of which were prepared by W6SAI.

MOBILE RIG?

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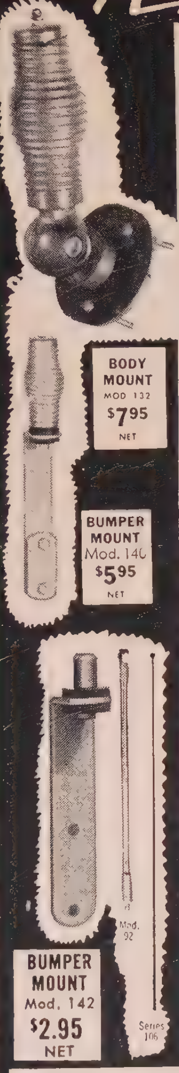

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Everything went along smoothly until W6ANN calmly announced that he had forgotten to bring the correct answers with him for all the questions.

Well, that's all there is. See you on the low end.

QTH's

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CN8ZZ	QSL to CN8MZ (he is ex-CN8ZZ)
CR4AC	Box 61, Praia, Cape Verde Island
EA2LS	Matia 14, San Sebastian, Spain
EA3BM	Carmen 30, Barcelona, Spain
EA3DK	c/o Valencia No. 506, Barcelona, Spain
EA3FL	Calvo Sotelo 10, Sabadell, Barcelona, Spain
EA3IG	Wilfredo 97, Barcelona, Spain
EA5AF	Puerto Rico 37-2A, Valencia, Spain
EA0HK	Postbox 6034, Madrid Spain (Stn. in Spanish Guinea)
EQ1RX	c/o 24 Wendover Road, Yonkers 5, N.Y.
EA6CT	Juan Cardona. P.O. Box 238, Palma de Mallorca, Balearic Islands
EA6AF	Bartolome Pina, Box 135, Palma de Mallorca, Balearic Islands
EK1WX	Tangier Radio Club, P.O. Box 150, Tangier Zone, No. Africa
FF8MH	Maurice Henry, Poste Restante, Dakar, French West Africa
FF8PG	P.O. Box 165, Dakar, French West Africa
F9QU/FM8	Charles Bernicot, P.O. Box 281, Fort de France, Martinique
FF8MM	Box 207, Dakar, French West Africa
FF8PM	Box 566, Dakar, French West Africa
FQ8SN	Box 208, Brazzaville, French Equitorial Africa
I1SSS	P.O. Box 165, Pavia, Italy
JA2BQ	7814 SE 13th Street, Portland, Oregon
KH6VX/KB6	c/o C.A.A., Canton Island
KG6SF	Saipan Navy 3245, Fleet P.O., Post Master, San Francisco, California
MP4BAD	Via RSGB
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MD2MD	Via RSGB
MF2AA	Via RSGB
MD4GC	Via RSGB or G. Cuppleditch, Posts Telegraphs Dept., Mogadishu, Somal
MP4BAC	Via RSGB
MP4BAE	c/o International Aeradio Ltd., Sharja Fort, Trucial Oman Coast, Persian Gu
MP4BAL	Bob Leo (W6PBV), Box 11, Manam Bahrein Is., Persian Gulf
MS4A	Fabrizio Coramelli, Alula, Italian Som iland
OE5YL	Miss I. Wieder, Plainstrasse 20, Sal burg, Austria
Poland	P.Z.K., Box 320, Warsaw, Poland
PJ5KO	c/o W6MEK
VQ4AQ	P.O. Box 1717, Nairobi, Kenya Colon British East Africa
VQ5ALT	P.O. Box 27, Entebbe, Uganda
VP8AO	R. Lenton, S. Shetland Is., c/o F.I.D. Port Stanley, Falkland Island
VS1DZ	G. H. Q. Signal Regt., Singapor Straits Settlements
VU7AH	P.O. Box 10, Tumkur, India
W3KZQ	Lt. Walter H. Johnson, USN, Na #214, Box H, c/o P.M. New York, N.
XZ2DA	Box 833, Rangoon, Burma
ZD4AV	Gold Coast Signal Squadron, Giffa Camp, Accra, Gold Coast
ZS3M	P.O. Box 636, Windhoek, South We Africa
ZS7C	Mr. Pickwan, Post Office, Goedgegu Swaziland, South Africa
ZS9D	Ivan Quarmby, P.O. Box 14, Franci town, Bechuanaland Protectorate
ZD1CL	H. M. Naval Base, Kissy, Fretow Sierra Leone
ZD3D	R. G. Smith, c/o International Aerad Ltd., Fajara Rest Camp, Bathurs Gambia
ZD4AC	J. C. Breakell, Box 933, Accra, Gol Coast
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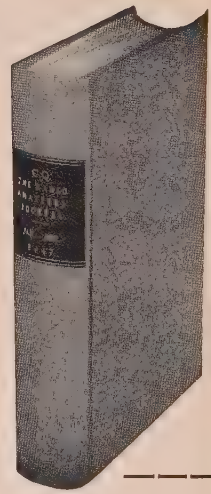

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V.H.F.-U.H.F.

(from page 39)

ɔport for the antenna? One can find good towers l masts pretty cheap these days. Maybe if you l promise to put a DX-collecting TV array up the same support, the XYL will let you adorn homestead with a real he-man tower! You can ure that if you double the height of your sky-ce above the average elevation of the terrain :hin a few miles of your station, you can pick a full S-unit at a distant point . . . And how ɔut that antenna relay? Try splicing around it, l if the loss is too high to take, better run out l buy one of the new low-loss types. Or work out of those systems using 1/4-wave line sections accomplish the transfer of antenna feeders from nsmitter to receiver in the same manner that early T-R boxes used on the low-band radar tems did the trick. How about those stations t you can hear every night but you can never se? Of course, they may have lousy receivers in many cases those fellows are running more ver than you are. It might pay, if you are out exploit the band to its utmost, to investigate the sibility of running higher power. (Take my rice, though, and follow this path with discre-ı. Since whooping our rig up to a half-gallon ut, our phone has been ringing pretty steadily. seems as though most of the so-called modern-ign TV sets can't cope with a potent 144 mc nal!)

ıcon Transmitters

n an earlier column we made mention of the sibility of certain amateurs setting up and main-ıing "beacon" transmitters which would be on air as continuously as possible to serve as able indicators of band conditions. Many of best six-meter band openings have occurred ing week days when a great majority of the ns have been at work and have been unable to ticipate. Who knows how many band openings e come and gone unobserved because there was signal on the air at the proper time and place permit checking of band conditions? In prac-.lly every case where continuously-broadcast sig-s are available in or near our ham bands, the g has put them to good use as barometers of d conditions. Some of the hams watch the ion between 30 and 50 mc for signs that the ɔsphere MUF is moving up toward the six-er assignment. Others monitor the strength high-frequency broadcast signals, watching for s on the higher bands have learned the trick watching the FM and TV broadcast signals r their favorite bands, and when the signals unusually loud, they stick pretty close to their ı-band receivers looking for unusual phenomena develop.

ılthough there might be some doubt as to ether these operating tactics are beneficial to

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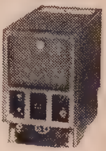

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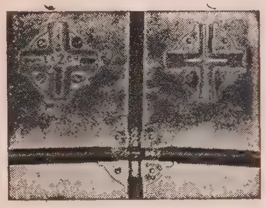

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hamdom as a whole, there is no doubt that the D men of the VHF bands are adding much to th store of knowledge about the capabilities and lin itations of our bands. The data they collect being put to good use by agencies outside t sphere of amateur radio. Thus, these hams a justifying the means they use to be in on a opening, and they are also helping to justify t existence of hams as such. We feel that the activity should be encouraged, not criticized.

It is apparent that several problems will ha to be solved before we can expect any great utiliz tion of beacon transmitters operated by amateu within our bands. The toughest problem is th of legality. At this time, there seems to be no go reason why a ham cannot put a signal on the a for beacon service, provided that the station r mains under his direct control at all times a that the character of the signal emitted is appr priate to the band in use. Of course, complete automatic, unmanned transmitters would be t ideal solution to the problem, but under the prese regulations they would not be sanctioned by t FCC. Perry Ferrell, RASO Project Supervisor, currently working on a plan of presentation to t FCC by attempting to obtain "Special Tempora Authority" to operate unmanned stations for certa individual amateurs.

In the meantime, some amateurs have start the ball rolling by commencing scheduled test tran missions. W9MBL of New Castle, Ind., is usi his regular six-meter transmitter on 50.043 with about 70 watts input, feeding a four-eleme beam. He points the beam in the direction whi seems to him at the time to be the most likely produce results. The signal consists of a continuo carrier, modulated 100% by a keyed audio to of 1020 cps. (This particular tone was probal chosen because of the popularity of the FL-8 au range filter. In the "range" position these filters pa 1020 cycles and greatly attenuate noise and oth disturbing phenomena. Try one sometime on 1020-cycle MCW signal; the performance w amaze you.) The keyer sends W9MBL ten tin per minute. The regular operating time of t station will be from 1600 to 1900 CST, and often beyond this as conditions permit. Ken int rupts the transmissions on the hour and each minutes thereafter with a manual CQ on strai

VE1QZ, of Halifax, Nova Scotia, is also pla
c.w. followed by a short listening period.
ning to put a scheduled six-meter signal on air. We are not certain at this time whether will use his 50.02 mc rock or whether he v operate on the 50.1 mc channel, which he of uses for regular work. He plans to be on automa transmission from 0800 to 1200 EST with his be aimed SSE. Under conditions which look encour ing he will continue to transmit from 1200 to 1 EST, gradually bringing the beam around to SW bearing. These transmissions will be on strai c.w. keyed at 18 w.p.m., and will consist of word "TEST," followed by a code word wh will be changed from time to time as a means checking accuracy of received reports, followed

"SIX DE VE1QZ VE1QZ VE1QZ HALIFAX CANADA." The keyer tape recycles every two minutes. With 220 watts back of this signal, VE1QZ is almost certain to drag in a flock of SWL cards!

We haven't heard much talk about putting beacons on the other VHF or UHF bands. Perhaps after the six-meter gang shows us the way, some philanthropic soul may volunteer to follow suit on the two-meter band. There is just as real a need for these transmissions on the other bands as there is on six. When getting started on a band that has practically no activity, these signals are especially helpful. A year or so ago W2VX, W2PEN, and Ye Ed were all set up for semi-automatic transmissions on the 420 mc band. The idea was to give the rest of the gang test signals to peak up their receivers and beams on, to let the rest of the gang know you were still around and ready to go on the band, and to provide information on propagation at all times. That particular idea died for lack of support, but it was none the less a good idea!

W2QNZ/6, who is still sunning himself in sunny southern California, is working on the idea of setting up a high-powered c.w. transmitter for the wo-meter band on top of one of those high mounains out there with the biggest durned antenna ne can put together beaming the signals east. He would plan to keep it on the air as often as possible o see whether the band cannot be forced open nuch more often than it has opened in the past.

It seems to us that if official approval can be btained, we will have plenty of signals to watch in he near future to determine just what's going on. . . . Time out, those marker signals from Vashington on 143.75 are starting to build up. . . . 'd better take a look across the band!

ix Meters In Review

The best way to present a comprehensive picture f the tremendous openings which rocked the ol' ix-meter band during the past couple of months s to list in chronological fashion a few represenative reports which we have received covering his time period. These listings are not intended o be complete, but merely typical.

The band came to life on October 16, after an outurst of aurora activity on the preceding two evenngs. HC2OT was the outstanding representative of outh America active on the band at the time, and e worked W9QKM, W9ZHL, W9UNS, W5BDT, V0INI, W0ZJB, W9ZBK, W3BGT, W5GNQ, V8CMS, W2BYM, W2KZG, W3MQU, W2QVH, V1CGY, W4RBK, W9NJT, and W3QFL. Then, ame a brief fade-out, and at 1125 EST W9NJT, V9JMS, and W9ALU came back in for a QSO. gain the band dropped out, returning around 220 EST, when W9ZHL and W9JMS showed up ith some selective fading. Then, around 1300 the and came back in force, and the following were orked: W6PUZ, W3NKM, W6OB, VE3ANY, V4FI, W8NQD, W5VY, W9ALU, W6ANN, V6ZUX, W5EMY, W6AMD, W0OUE, W7FGG, V6TMI, W0OLY, K6BF, W0ZJB, W0QIN, V6PUZ, W6BQR, W6SFL, and W6ZVD. After

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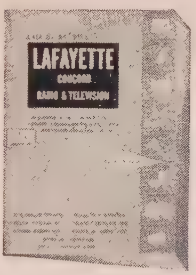

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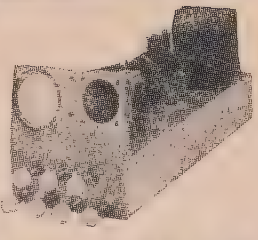

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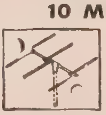

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a third fade-out the band came in again at 1748 EST with W5VY, W5ONS, and XE1QE being worked. During this period KH6PP got on the air and worked a flock of LUs.

Things began to happen again on Oct. 20. KH6PP on this date at 0524 EST got in a short QSO with VK2ARG, who is located about 20 miles north of Sydney. At about 1730 EST the path opened from W6-land to Hawaii. KH6NS and KH6OV, two newcomers on the air, worked K6BF, W6AMD, and W6FFF before 1920 EST. There was a short burst of sporadic E skip around 2100 to 2130 EST throughout the continent, but it was very spotty. At about 1620 EST on Oct. 21 the lower-W6 to KH6 path re-opened with fair to good signals until 1842 EST. During this opening rebound, scatter was heard by K6BF. KH6PP reports hearing JA2AZ from 2135 until 2300 EST.

Some sporadic E was again reported throughout the U.S.A., particularly on paths north-south from W5 to W7 and VE5. On the 22nd some auroral scattering between 2030 and 2140 EST was reported in the northeast sections. Meantime, KH6PP again heard JA2AZ from 2058 to 2145 EST; then, between 2208 and 2330 ZL1MQ and ZL1HP broke through.

On the 23rd of October conditions were unstable. Around 1800 EST the band opened between lower W6 and W7 to KH6, W7QLZ working both KH6NS and KH6PP. Signals faded after 1915. W6WNN also heard an unidentified signal which seemed to be signing KG6—during this opening. KH6PP again heard JA2AZ from 2100 to 2200 EST. Nothing further was reported until early in the morning of the 25th (in Hawaii); then KH6PP got ZL1AO and ZL1HP. This opening returned 24 hours later, starting at 0415 EST. On this occasion KH6PP worked nine ZLs! This opening lasted until 0518 EST. Auroral scattering was reported between 1830 and 2045 EST by stations in northeastern U.S.A.

On the evening of the 26th in Hawaii, around 0040 EST of the 27th, KH6PP hit another transpacific opening which netted him three more ZL QSOs. Auroral scattering was reported throughout North America from 1740 until 2330 EST. During this period VK2ARG reported hearing W9ZHL at 1900 EST. This has been confirmed, although W9ZHL had his beam aimed north at the time!

By the morning of the 28th conditions looked right for DX. HC2OT turned on his receiver at 0806 EST and heard W2BCR coming through. Several minutes later he heard W1DJ-W1OIR. Meanwhile, LU9MA worked W1OIR at 0830 EST. Around 1100 LU9MA got W8NQD, W9ZHL, and W2RVL, then K6BF at 1240 EST. If more stations had been active, this opening might have equalled that of the 16th. Just before 1700 EST the whole Pacific coastline was favored with a transpacific opening. First, KH6OV and KH6NS broke through, being heard from VE7CN to W6FFF. At 1900 EST K6BF worked ZL4GY and heard ZL1HP. At the same time W6FFF worked ZL1HP and heard ZL4GY. The opening only lasted about 15 minutes with signals fair to good. VE7CN ad an incomplete QSO with a ZL at 1713 EST.

The good conditions persisted throughout the ight and into October 29. Shortly after midnight ST KH6PP began working a string of ZLs and Ks. In the next five hours 13 ZLs and a couple of Ks. Shortly after noon EST, the LUs began reaking through into the lower W6 and W7 all areas. This opening appeared to travel com- letely around the globe, as PA0JM, who is onitoring six meters, although not permitted to ansmit on this band, heard a a W4 using c.w. at round 0800 EST. LU9MA was worked by V6WNN, K6BF, W6AMD, W6FFF, W7QLZ, nd others. LU6DO was also in on this opening, ut again language difficulties arose. W7JPA icked up some rebound scatter at 1355 EST com- g in from the southeast, although originating to ne northwest, at W7DYD. The MUF was ex- emely high as LU9MA worked W6FSH, who as on 51.2 mc. Only an hour or so after the South mericans had faded out, the transpacific path e-opened. This time ZL1AO, ZL1DE, ZL1MN, L2DS, and ZL1QU were heard or worked by ne gang in lower W6-land, including W6TMI, 6BF, W6FFF, etc. Finally, the path re-opened om KH6 to Australasia with KH6PP working L1QF, ZL1HP, and VK4RY. In the mid-after- oon (EST) KH6PP worked LU1BV and LU6- O. The trans-Pacific DX had nearly died out, though K6BF heard ZL1HP at 1715 EST.

On November 1st WWV started sending their ew "U" signal. As a result, many fellows were prepared for a wide-spread sporadic E opening that started around 1900 EST and lasted through midnight. The following morning LU4DI and LU9MA broke through around noon and were worked by various stations from coast to coast. Again it is difficult to assay the strength of this opening, since activity was very meagre. However, LU9MA was heard as far north as VE5NC and was worked by W6BQR while LU4DI was worked by W2BYM at 1308 EST and heard by W7QLZ around 1300 EST. November 3rd opened with LU1BV being worked by W7DYD, W7JPA, W6AMD, etc. between 1312 and 1350 EST. LU9MA was also in on this opening. This date was also the occasion for a small transcontinental opening, again hampered by lack of activity. W6AMD heard W1HMS at 1243 EST, while W2BYM worked W6TMI at 1300 EST.

On November 5th HC2OT broke through to W5 around 1000 EST. On the 11th, LU9MA's signal bounced all the way to VE7. At 1453 EST, VE7DU heard LU9MA with a musical background on his carrier. Then he heard LU9MA call CQ and come back to VE7BQ at 1457 EST. QSB set in, and VE7DU missed a QSO, but LU9MA heard his c.w. signals as the band was on the way out. On the 12th, W9ZHL contacted HC2OT at 1003 EST. On the morning of the 13th, short skip broke out throughout the whole continent, and W6MNN worked VE1QY at 1235 EST. HC2OT was also on, and worked W9ZHL, W9JMS, and W5EMY between 0942 and 1005 EST. An opening

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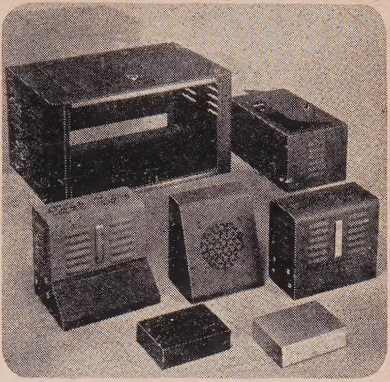
ıs reported for the 15th from W5 into XE be-
een 2100 and 2128 EST. On the 16th the midwest
perienced sporadic E conditions, with the W5s
orking W9s and W0s.

Many of the gang were on the air on Sunday
orning, November 20, before 0900 EST when
C2OT broke through into the eastern section
the country. Here is a sample of Steve's QSOs:
2BYM, W3MXW, VE3AJJ, W4CVQ, W2RLV,
9MBL, W9ZHL, VE1QZ (who got so excited
at he blew the main fuses!), W1RO, W1HDF,
1QVF, W1DJ, W1GJO, W1HMS, and W2AMJ.
rom about 1019 until 1045 EST the signal was
nbelievably potent, peaking up to way over S9
our QTH. The best trans-continental opening
nce 1947 broke around 1130 EST. W6s worked
E1, W2, W3, W4, and W8, while the W7s were
orking the W4s. W6WNN and W6ANN both
ade WAS with their Vermont contracts, thanks
W1CGX! As a sample of activity, here is a
rtial list of the stations logged at our QTH in
uthern New Jersey: W6WNN, W6TMI,
6JRM, W6OB, W6ERE, W6EIB, W6SFL,
6ANN, W6AMD, W6DQY, W6QG (3 watts),
6AOR, W6AWY, W6QUK, W6YHR, W6GCG,
6CCJ, W6WSQ, W6IWS, and K6BF (who
oved up to 50.7 to dodge the low-end QRM!).
t the time of this opening, WWV was again
nding "W" signals, so there is a good chance
at this signal might point the way to good
x-meter band conditions.

Space limitations prevent further description of
e happenings on six meters (or any other
nds for that matter). We deemed it best to in-
ude a full description of the history-making six-
eter activity, even at the risk of being criticized
r overlooking the other bands. Since the end o
e DX season on two meters, we have not been
le to hear reports from much more than 100 mile
vay over the air, so please fellows, if you have
ws to report, send it in. We hope to be able to
e all the information you send along, and be
tient; we are trying to acknowledge all reports.
kes time!

The rabid six-meter operators who would like
get more information on the happenings on this
nd should look into the possibilities of joining
e RASO project. Most of the information which
have on six-meter activtity comes to us via the
ports you fellows send in to Perry Ferrell, and
e regular project Newsletters are crammed with
luable information for the six-meter fraternity.

In an effort to spend more time listening on six
eters while devoting some time to other activities
ound the shack, Ye Ed has devised an automatic
l twister for the six-meter converter. Has any-
e some good advice on how we can keep the
nsitivity of the thing high enough to catch those
l weak signals without having it grinding out
ises all the time? By next month we expect to
ve an automatic alarm on the gadget, and after
t comes an automatic QSOer which will grind
t QSL cards for W2PAU while the OM is at
office! See you on six and two meters,
ıg. . . .



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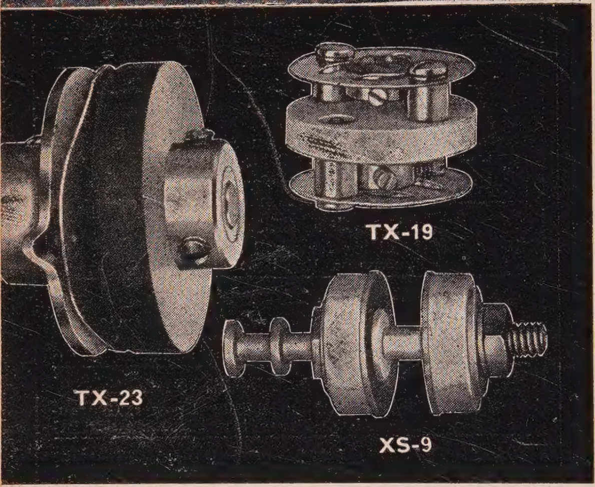

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REGULATION

(from page 21)

to that of *Fig.* 3, except that HK 257Bs were used in the final. Regulation of the 2000-volt supply has been excellent and leaves nothing to be desired except a better line. Even this has been minimized by the regulator system described.

The phone man could adapt this scheme for use on the class B modulator supply with the aid o some circuit kinks. This system would seem to b well-suited to the low-voltage, high-current supplie currently gaining favor; the bleeder tube could b a small transmitting tube or a husky receiving tube such as the 6L6.

The use of vacuum tube bleeders provides measure of safety also. It is not likely that th tube(s) will go completely dead the way a bleede resistor does when it opens up. In any event, yo will live longer if you pull the big switch befor sticking your hand into the rig.

SCRATCHI

(from page 6)

activities for 1950 are getting wrapped up tight than dial cables on a.c.-d.c. set.

Here are what Scratchi are signing: "I resol not to write to any ladies unless Lil are personal reading letter and okaying same. I resolve not look at any female woman unless they looking at m I resolve not to working any station on the unless knowing it not a woman amateur. I resol not to going out with any female ladies unless th be Lil." Hackensaki, according to this, are o being able to sit in corner of room reading boo

Well, that are several weeks ago, and here are the first of January, so are having to st living up to New Year's resolutions. Of cou Scratchi are not taking this lying down, and I reading what I signed very, very carefully, and c looks are not too dim. For examples, I are supposed to be writing to any ladies unless reading letter. Hahh, so I typing to ladies, o making sure, just typing to females who not lad

Also, I not supposed to looking at female wom unless they looking at me. But, how can tellin not looking. So, will just looking at them to if they looking at me and if not then I have keep looking at them to making sure they not lo ing at me, on acct. if they are then I can and I wanting to taking any chances.

In third resolution Scratchi not being abl work anybuddy on air unless know is not a This are lead-pipe cinch. I just working on se Here are not knowing if a station is a woma having to work them to finding out.

The last resolution are sticker. I can only g out on dates with Lil. Hmmm, you knowing, Ed., this are no great burden to bear, maybe joying this after all. Yours for many more 195

Respectively your
Hashafisti Scratc